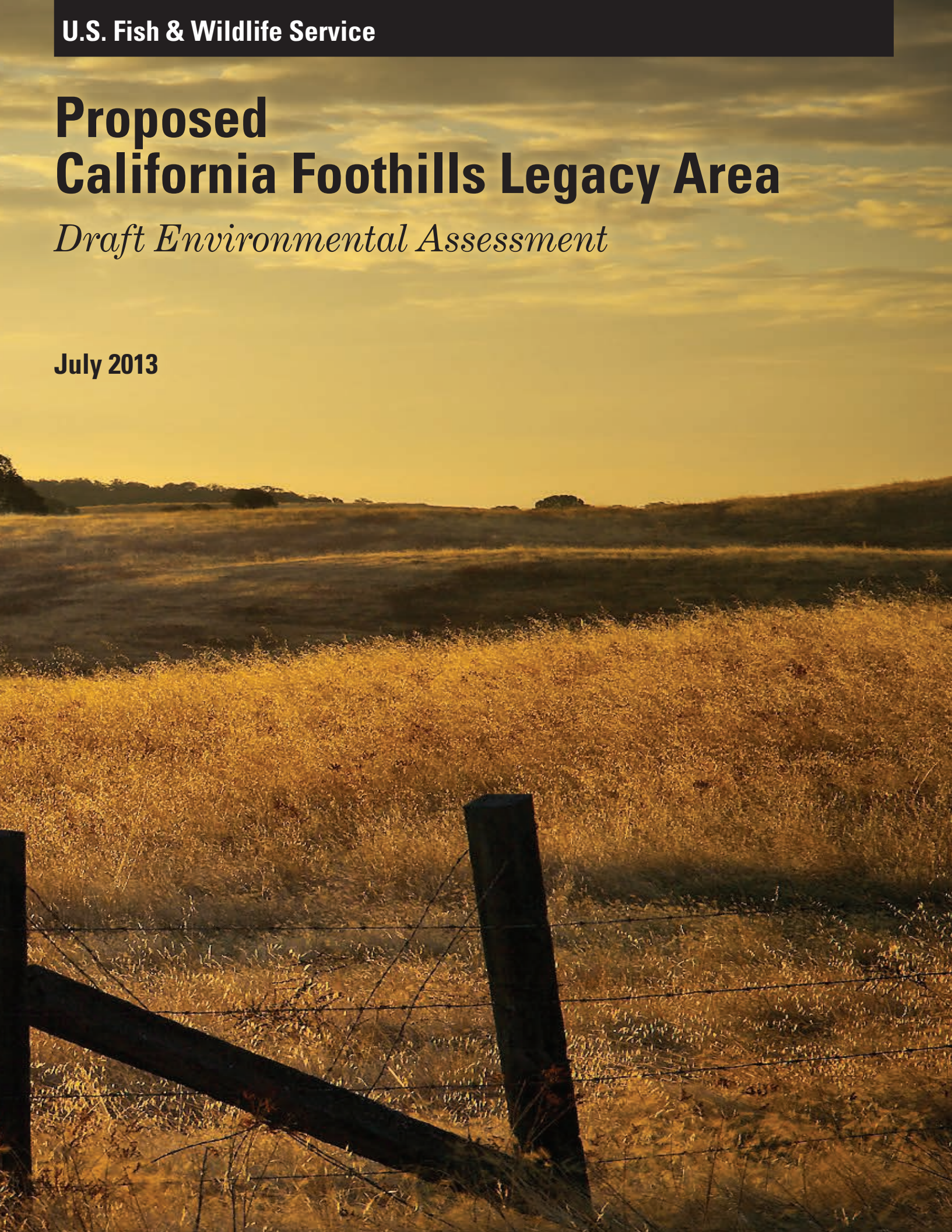
U.S. Fish & Wildlife Service

Proposed California Foothills Legacy Area

Draft Environmental Assessment

July 2013



Key Terms

Conservation Easement	A voluntary, legally-binding agreement between a landowner and a government agency or qualified organization regarding the future uses of private property. The conservation easement is recorded and becomes part of the deed to the property. (see Appendix B – Easement Q&A)
Proposed Program Areas	Areas eligible for CFLA easements under the preferred alternative (Alternative B), including: Sierra Nevada foothill rangelands within Merced, Mariposa, Stanislaus, and Tulare Counties; and Diablo Range foothill rangelands in Merced and Stanislaus Counties (see Chapter 2, page 2-4)
Potential Program Areas	Areas eligible for California Foothills Legacy Area (CFLA) easements under Alternative C, including: Sierra Nevada foothill rangelands within Merced, Mariposa, Stanislaus, Tulare Counties, and Kern Counties; and Diablo Range foothill rangelands in Merced, Stanislaus, and San Benito Counties (see Chapter 2, page 2-4)
Priority Species / Habitat	Priority species and habitats are the elements of rangeland ecosystems that we aim to conserve and include species, vegetation communities, and habitat features (Appendix C). All of these conservation targets are either Federal trust species or habitats that support numerous trust species, making them worthy of protection on their own. However, conserving habitat for these species also will protect habitat for many other species with similar habitat requirements. (see Appendix C)
Rangeland Ring	Nearly 14 million acres of privately-owned rangelands encircling California's Great Central Valley. Lands within this "Rangeland Ring" are predominantly working ranches that include a rich and varied landscape of grasslands, oak savanna and woodlands, vernal pools, riparian areas, and wetlands. (see Chapter 1, page 1-3)
Easement Template	The starting point from which we negotiate easement terms with individual landowners. Our conservation easements are customized to fit a landowner's individual situation, and the terms of the easement are established only after detailed discussions between the landowner and the Fish and Wildlife Service. (see Appendix B –Easement Template)
Trust Resources	Trust resources are those species for which the Fish and Wildlife Service has been given specific responsibilities under federal legislation. Within the Rangeland Ring, Service trust resources include migratory birds and federally listed threatened or endangered species.

Reader's Guide

The U.S. Fish and Wildlife Service (Service) proposes to launch a new conservation easement program within the ring of privately-owned foothill rangelands surrounding the Central Valley – the California Foothills Legacy Area (CFLA). The CFLA easement program would provide a new tool to help ranching families stay on their land while permanently protecting a portion of this important resource for wildlife. The proposed CFLA would be completely voluntary. No new regulatory requirements would be placed on lands within or outside the program area. Ranchers would retain ownership and management of their lands. Ranches within three areas would be eligible for the program, depending on which alternative is selected: central Sierra Nevada foothills within Stanislaus, Merced, and Mariposa counties; southern Sierra Nevada foothills within Kern and Tulare counties; and the portion of the Diablo Range within Stanislaus, Merced, and San Benito counties. Through the CFLA, the Service hopes to make an important contribution to conserving one of California's last great open spaces – privately-owned foothill rangelands and the unique and diverse wildlife habitats and species they support.

The purpose of this Environmental Assessment (EA) is to answer some basic questions about the proposed action:

- What is the proposed action being considered by the Service?
- What is the purpose and need for this proposed action?
- What environmental resources might this proposed action affect?
- Are there feasible and reasonable alternatives to the proposed action?
- What are the consequences of inaction or continuing on the current course?
- What are the likely environmental consequences (impacts, effects) of the proposed action and alternatives?

To answer these questions, this document includes six chapters, a glossary, a list of references, and four supporting appendices. Following are brief descriptions of the function of each chapter.

Chapter 1 – Purpose of and Need for Action. This chapter provides an overview of the proposed action (i.e., launching a new easement program) while setting the stage for the five subsequent chapters and three appendices. It describes why the Service is proposing to launch the California Foothills Legacy Area, a new rangeland easement program, and details what specifically is being proposed and the decisions that need to be made. Chapter 1 also explains the planning process we followed in developing this proposal; describes the key issues, concerns, and opportunities identified during public scoping; lists other rangeland conservation efforts in the study area; and gives background on the authorities for launching the program.

Chapter 2 – Description of the Alternatives. This chapter presents two alternatives that the Service believes would fulfill the purposes and goals of the CFLA. Chapter 3 also describes the No Action Alternative under which the CFLA would not be launched. The No Action Alternative serves as the baseline for comparing the two action alternatives.

Chapter 3 – Affected Environment. This chapter describes the general physical, biological, and socioeconomic environment within the CFLA study area while providing further details about the proposed program areas. This chapter's descriptions provide a baseline so that the beneficial and adverse impacts, or effects, of the CFLA proposal can be reasonably assessed.

Chapter 4 – Environmental Consequences. This chapter evaluates possible environmental effects (beneficial and adverse) of implementing each of the alternatives. Impacts discussed cover the biological and physical environment, cultural features, and socio-economic considerations. Not only

are impacts discussed as beneficial or adverse, but also whether they are direct, indirect, cumulative, or unavoidable.
Chapter 5 – Literature Cited. This chapter lists the references that were cited in the previous four chapters of the environmental assessment.

Appendix A – Land Protection Plan (LPP). The LPP describes the Service's plans for implementing the proposed CFLA program. It provides local landowners, government agencies and municipalities, organizations, and the interested public with a description of how rangelands of interested landowners would be prioritized for acquisition. The LPP also describes potential funding sources for easement acquisition and provides a cost estimate for implementing the program.

Appendix B – CFLA Conservation Easement Template and Q and A. The easement template is the starting point from which we negotiate easement terms with individual landowners. Our conservation easements are customized to fit a landowner's individual situation, and the terms of the easement are established only after detailed discussions between the landowner and the Service.

Appendix C – Priority Species and Habitats Considered in the CFLA Planning Process. This appendix illustrates all of the species and habitats of concern that were considered as potentially benefitting from the CFLA, and more specifically, were used to guide in the identification of CFLA program areas.

Appendix D – Passages Relating to Rangeland Conservation found in the General Plans of Merced, Mariposa, Stanislaus, Tulare, San Benito, and Kern Counties. This appendix includes passages relating to rangeland conservation found in the general plans of each of the potential program area counties.

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Cattle and geese graze near a vernal pool.

Chapter 1. Purpose of and Need for Action

1.1 Introduction

Environmental Assessment (EA) describes and evaluates a proposal by the U.S. Fish and Wildlife Service (Service) to launch a new conservation easement program within the ring of privately-owned rangelands surrounding the Central Valley – the California Foothills Legacy Area (CFLA). The CFLA easement program would provide a new tool to help ranching families stay on their land while permanently protecting a portion of this important resource for wildlife. The proposed CFLA would be completely voluntary. No new regulatory requirements would be placed on lands within or outside the program area. Ranchers would retain ownership and management of their lands. Through the CFLA, the Service hopes to make an important contribution to conserving one of California's last great open spaces – privately-owned foothill rangelands and the unique and diverse wildlife habitats and species they support.

1.2 Proposed Action

The Service proposes to launch the CFLA, a new voluntary conservation easement program, to permanently protect up to 200,000 acres of working rangelands that are of high value to wildlife. Since the CFLA proposal represents a potential new federal action or activity, it constitutes a "proposed action" that needs to be evaluated for any effects it may have on the quality of the human environment. The development of this proposal is subject to the requirements of the National Environmental Policy Act or "NEPA" (42 U.S.C. 4321 et seq.; 83 Stat. 852), thus giving rise to the development of this EA.

1.3 Need for the Proposed Action

California's Great Central Valley is surrounded by nearly 14 million acres of privately-owned foothill rangelands. Lands within this "Rangeland Ring" are predominantly working ranches that include a rich and varied landscape of grasslands, oak savanna and woodlands, vernal pools, riparian areas, and wetlands. These rangelands provide a home for a breathtaking diversity of wildlife, supporting over 500 wildlife species including nearly 300 species of birds and numerous imperiled species. These rangelands continue to provide essential habitat for wildlife and the economic foundation for many

rural communities due to the land stewardship practices of ranching families who have owned and managed them for generations. Rangelands are economic, ecological, and cultural resources that are important to California and the nation.

Yet of all the major habitats in California, rangelands are among the least protected and most threatened. Rangelands face a variety of threats, including: conversion to more intensive land uses such as urban and rural residential development, orchards and vineyards, invasive species, and climate change. Between 1984 and 2008, over 380,000 acres of California rangeland were converted to other uses (Marty *et al* 2012). By 2048, the state's population is estimated to swell to more than 50 million people (California Department of Finance 2012). Seven of the top 10 fastest growing counties in California are Rangeland Ring counties (California Department of Finance 2012). In total, the population of Rangeland Ring counties is projected to grow by 48% by 2050. Over the next decade, between 200,000 and 550,000 acres of land will be required to accommodate the needs of new urban residents and over half of this land is expected to be rangeland (CDF 2010). Landscapes that were once home to cattle, soaring hawks, and majestic blue oaks are now home to subdivisions, ranchettes, vineyards, and orchards; this conversion is accelerating. Another growing threat to ranching and rangelands is economic viability. Ranching can be a tough economic enterprise, and increased challenges to the viability of the industry loom on the horizon. A survey of California ranching operations reported that in 2009: 38% lost money, 19% broke even, and 42% made a profit. Only 13% of all ranching operations made a profit greater than $10,000 (Wetzel *et al*. 2012). These surveys support the earlier research that found producer's motivations to maintain ranching operations are not necessarily driven by profit (Liffman 2000). Regardless, ranching operations must be profitable to be sustainable into the future. Voluntary easement programs such as the proposed CFLA may provide a tool for maintaining some family ranching operations into the future.

Some efforts are already underway to help ensure the long-term viability of California's rangelands. For example, regional land trusts, conservation organizations, and agencies have worked to conserve over 540,000 acres within the Rangeland Ring through conservation easements. Many of these easements were funded through State bond-funded programs such as the California Rangeland, Grazing Land, and Grassland Protection Program; the Preservation of Ranches and Agricultural Lands Grant Program; or Farm Bill programs managed by the U.S. Department of Agriculture's (USDA) Natural Resource Conservation Service (NRCS). All of these programs have limitations and an uncertain future. In the words of the Rangeland Trust, "Funding is our biggest challenge." The Rangeland Trust has over 400,000 acres of private rangelands awaiting funding for conservation easements (http://www.rangelandtrust.org/). Clearly, additional resources are needed to meet this conservation challenge.

1.4 Legislative Authority and Purposes

The purpose of the CLFA is to conserve working rangelands that are of high value to wildlife. Congress has given the Service general authority to acquire lands or interests in lands for different purposes. The laws and associated purposes relevant to the proposed CFLA easement program are:

"…for the development, advancement, management, conservation, and protection of fish and wildlife resources...." 16 U.S.C. 742f(a)(4) (Fish and Wildlife Act of 1956); and,

"... conservation, management, and ... restoration of the fish, wildlife, and plant resources and their habitats ... for the benefit of present and future generations of Americans..." 16 U.S.C. 668dd(a)(2) (National Wildlife Refuge System Administration Act of 1966, as amended).

1.5 Vision

A network of privately owned and managed rangelands that are permanently protected through voluntary conservation easements held by the Service and a variety of land trusts, conservation organizations, and other agencies. These rich and varied rangelands --including grasslands, oak

woodlands, vernal pools, riparian areas, and wetlands -- will support economically viable family-owned ranching operations. Grazing and other stewardship practices of ranchers will continue to provide habitat for sustainable populations of migratory birds and other wildlife and contribute to the recovery of imperiled species.

1.6 Goals

Three overarching goals were developed for the proposed CFLA. The goals are intentionally broad, descriptive statements of the desired future conditions. They support the proposed purposes and direct efforts to help achieve our vision for the CFLA.

- Conserve and maintain the existing diversity of grasslands, oak woodlands, vernal pools, riparian areas, and wetlands in the foothill rangelands surrounding the Central Valley and the diversity of migratory birds and other wildlife they support.
- Contribute to the recovery and protection of threatened and endangered species on California rangelands, and reduce the likelihood of future listings under the Endangered Species Act.
- Support the long-term viability of the ranching industry that supports these species by promoting opportunities for ranchers to participate in voluntary rangeland conservation efforts and provide incentives for cooperation.

1.7 Study Area and Potential Program Areas

The area evaluated for the proposed CFLA includes the ring of privately-owned foothill rangelands surrounding California's Great Central Valley (Figure 1). This 14 million-acre "Rangeland Ring" includes portions of 26 counties. The inner boundary of this ring is the 450-mile long floor of the Central Valley. To the east, north, and northwest, the outer boundary is based on the transition between blue oak woodlands and montane hardwood to coniferous forest in the Sierra Nevada Range, Cascade Range, Klamath Mountains, and the North Coast Range. Most of the lands above this boundary are public lands managed by the U.S. Forest Service, National Park Service, and Bureau of Land Management. The western boundary follows Highway 101 south from Lake County to the Santa Ynez Range in Santa Barbara County. The boundary then cuts across the southern Central Coast toward the crest of the Tehachapi Mountains. Elevation in the Rangeland Ring stretches from a few hundred feet on the valley floor to 7,000 feet in the southern Sierra Nevada. Within the Rangeland Ring, we have identified three potential program areas using a broad-scale analysis tool described in Chapter 3 of the Land Protection Plan (Appendix A) and from public feedback received during our scoping process: Central Sierra Nevada foothills, Southern Sierra Nevada foothills, and the Diablo Range.

1.8 The NEPA Planning Process

The planning process for the proposed CFLA-EA was initiated during Spring 2011, adhering to the essential steps required by NEPA and Service policy (Figure 2).

The NEPA process consists of an evaluation of the environmental effects of a proposed federal action e.g., CFLA) as well as reasonable alternatives to that action. This process enables the Service to make informed decisions about the effects its proposed actions may have on the environment. The Service prepares written environmental assessments (EA) to determine whether or not a proposed action would significantly affect the environment. The EA is intended to be a concise document that (1) provides sufficient evidence and analysis for determining whether to prepare an Environmental Impact Statement (EIS); (2) aids the agency's compliance with NEPA when no EIS is necessary; and, (3) facilitates preparation of an EIS when one is necessary.

If an EA concludes that no significant environmental effects will result from its proposed action, then the Service will issue a finding of no significant impact (FONSI) and will not prepare an EIS. The FONSI may address measures which the agency will take to reduce (mitigate) potentially significant

Figure 1. California Rangeland Ring.

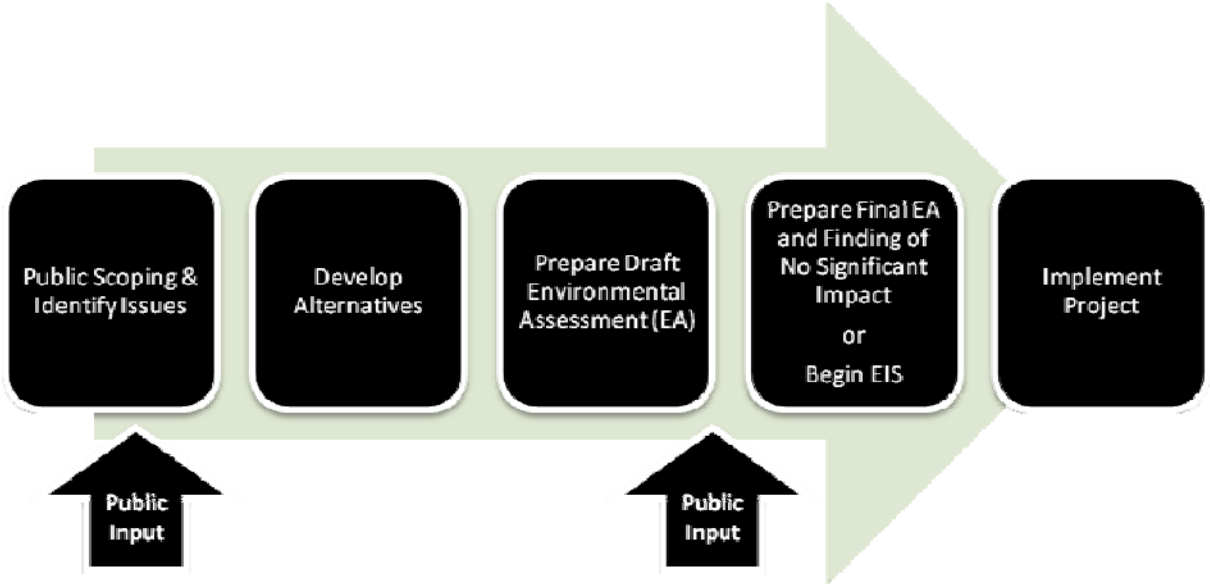


Figure 2. CFLA Planning Process.

impacts. Conversely, if the EA determines that the environmental consequences of a proposed federal undertaking may be significant, an EIS will be developed.
The public has an important role in the NEPA process, particularly during scoping, in providing input on what issues should be addressed in an EA and in commenting on the findings in the NEPA documents offered by the Service. The public can participate in the NEPA process by attending public meetings and/or by submitting comments directly to the Service. The Service must take into consideration all substantive comments received from the public and other parties on NEPA documents during the comment period.

This CFLA proposal is currently in the second public input phase, as shown in Figure 2. All previous steps, including public scoping of issues and concerns, are summarized as follows. Background information about the Land Protection Plan (LPP)/LPP/EA process was posted to the CFLA website (http://go.usa.gov/YMWQ), circulated via news release, and mailed to known interested parties to gather input and comments. Public scoping meetings were held in 2011 in Bakersfield (June 6), Porterville (June 7), Le Grand (June 8), Sonora (June 9), Red Bluff (June 14), and Hollister (June 16). Approximately 400 people attended the six meetings, and verbal comments were recorded. In addition, a presentation regarding the proposed CFLA was given at the California Cattlemen's Mid-Year Meeting in Rohnert Park (June 22). Additional comments were received via letters, faxes, comment cards (49), and emails (78). The scoping comment period ended on July 15, 2011. In November 2011, a second planning update which briefly summarized scoping comments was distributed to a growing mailing list of over 500 landowners, local government officials, and other stakeholders. A more detailed scoping report was also made available on the website. The issues identified in these comments have been summarized in a Scoping Report, and have provided a basis for developing the alternatives within this CFLA EA. A number of issues noted in that report are addressed in the Public Involvement and Issue Identification section below. In April 2012, we distributed a short document which provided answers to frequently asked questions about the CFLA proposal. Since then, the Service has been developing and analyzing alternatives and drafting the environmental assessment. The Service has also met with a variety of stakeholders including local cattlemen's and farm bureau groups and county boards of supervisors.

1.9 Decisions to Be Made

Based on the alternatives analysis provided in this draft EA, and considering public comments on the EA, the Regional Director of the Service's Southwest Pacific Region, with the approval of the Director of the U.S. Fish and Wildlife Service, will make three decisions:

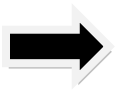
? Determine whether the Service should launch the CFLA easement program;
? If yes, select a CFLA program area alternative to implement;
? If yes, determine whether the selected alternative would have a significant impact on the quality of the human environment as required by the National Environmental Policy Act of 1969. If the quality of the human environment would not be significantly affected, a finding of no significant impact will be signed and made available to the public. If the alternative would have a significant impact, completion of an environmental impact statement would be required to address those impacts.

1.10 Public Involvement and Issue Identification

Public involvement is a critical part of the NEPA process. It ensures that interested parties are aware of a proposed action and that the planning process benefits from information, concerns, or issues offered by the public.

The key issues derived from the scoping process form the basis for developing and comparing the management alternatives we analyze in Chapter 3. The wide-ranging opinions on how to address key issues while adhering to NEPA, Service planning requirements, and the proposed CFLA vision and goals contributed to the alternatives offered. It is important to note that key issues are those the Service has the jurisdiction and authority to resolve. We describe them in more detail below.
The following summary represents input received during the scoping period for the CFLA (re: Planning Process above). A number of comments received indicated either support or opposition for the proposed easement program. Written comments (totaling 127 letters, faxes, comments cards, and emails) were divided between support for (55%) and opposition to (45%) the concept of a FWS easement program. Verbal comments at scoping meetings are more difficult to quantify. At three of the scoping meetings (Bakersfield, Red Bluff, and Hollister), a majority of the commenters expressed opposition to the concept. At the other three scoping meetings (Porterville, Le Grand, and Sonora), the responses ranged from mixed to mostly positive. The substantive comments received are summarized below. These comments are grouped under different issue topics which are expressed as questions. Below each question we have identified where that topic is addressed in the EA. These issues provide a basis for developing a range of alternatives to be considered in the planning process as well as the topics which will be addressed in the planning documents.

What restrictions would be included in the easements? Several respondents asked about the type of restrictions that the easements would include, such as limits on: the number and type of livestock; conversion to other agricultural uses such as vineyards; placement or construction of improvements such as stock ponds and wells; fire suppression; and pest control. A few respondents asked what would happen if there is a violation to the terms of the easement. Finally, many respondents asked to see an example easement document.



In general, the easements would prevent development and major land use changes. The CFLA Template Easement and incorporated exhibits (Appendix B) detail what restrictions would be included in a typical easement. Each conservation easement would be adapted to accommodate the property owner's needs where possible. The Service expects that the easements would be "minimally restrictive" and that most if not all rights sold by a landowner through an easement transaction would be rights that they had not planned on exercising. By placing restrictions on usage and

development, a landowner would be voluntarily selling a portion of their property rights. Ranches with conservation easement can be sold but easement restrictions are retained in title, which assures that such lands will continue to be used for ranching and not developed. Violations of a conservation easement would be carefully explored by the Service to assess appropriate corrective actions.

What would the term (length) of FWS easements be? Several respondents stated that perpetual easements are too long. Several others suggested that easements include a 5-year trial period before they become permanent. Others suggested that the easement be for 10, 50, or 100 years or more.

Easements with the proposed CFLA would be permanent. Our rationale for using permanent easements is described in "Alternatives Considered but Not Studied in Detail" on page 2-5.

What is the easement acquisition process? We received several questions about the easement acquisition process. Several respondents questioned how the appraisal process worked, who performed them, and whether the potential for development figured into appraisal values.

The easement acquisition process is described in "Questions and Answers for Landowners about Proposed California Foothills Legacy Area Rangeland Conservation Easements" (Appendix B).

What are the benefits of easements? We received several questions about the financial, legal, and regulatory benefits of easements.

Common benefits of easements are described in "Questions and Answers for Landowners about Proposed California Foothills Legacy Area Rangeland Conservation Easements" (Appendix B). However, some easement benefits such as property and estate tax reduction are subject to complex rules, so seeking professional advice is strongly recommended.

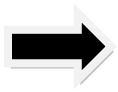
How would an easement program affect local/regional economies and local land use planning efforts? We received several comments on the potential economic effects of the proposed CFLA on local and regional economies, such as potential changes in land values, county tax revenues, and housing prices. Others asked how the proposed program could affect land use planning efforts such as county general plans.

Effects of the proposed CFLA on local/regional economies and local land use planning efforts are addressed in the Socioeconomic Environment section of Chapter 4, beginning on page 4-8.

Would land trusts/NGO's have a role in an easement program? Several respondents requested that third parties (e.g., land trusts) be allowed to hold CFLA easements, or have some other role in implementing the proposed program such as easement outreach and monitoring.

Third parties cannot hold CFLA easements since they would be purchased using federal funds that prohibit such an arrangement: the Land and Water Conservation Fund and the Migratory Bird Conservation Fund. Congress mandates that only the federal government is authorized to hold easements purchased by these funding sources. However, we are exploring options to work with third parties such as land trusts to do outreach and monitoring for the program.

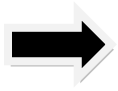
What would the proposed easement program cost and could the funding be used for other purposes? Several respondents asked about the projected costs of the program, whether program funds could be used to support other rangeland conservation efforts such as the Williamson Act. Another respondent asked us to consider the value of ecosystem services when determining the cost effectiveness of the proposal.



Initially, the program would be administered using existing staffing and funding. When fully implemented, we estimate that the program would cost approximately $150,000 per year to administer. The per-acre cost for conservation easements would vary by land value and the type of restrictions or rights acquired through the easement. Easements would be valued by a qualified outside appraiser using an adjusted land value based on a percentage (usually between 20 percent and 60 percent) of the full fee-title value of the land. Current land values within the proposed CFLA program areas vary from about $300 per acre to $3,000 per acre, depending on a variety of characteristics.

Regarding use of funding for other purposes, "Alternatives Considered but Not Studied in Detail" in Chapter 2 (beginning on page 2-5) describes other alternatives we considered and why we cannot/are not pursuing them. Federal funds used to purchase conservation easements are dedicated to land acquisition and cannot be matched or used to support other land conservation efforts. Consideration of the value of ecosystem services and cost effectiveness are discussed in Chapter 3 – Affected Environment.

Would the proposed CFLA result in the increased regulatory scrutiny of easement program participants and their neighbors or others within identified focal areas? Many respondents expressed concern that the proposed easement program could lead to increased scrutiny under environmental laws.



Implementing a CFLA conservation easement program would protect lands in perpetuity thus minimizing regulatory oversight that usually accompanies lands subject to development. The CFLA Template Easement and accompanying Q&A (Appendix B) address easement monitoring. We believe the 30+ year history of our existing easement program in the Central Valley demonstrates that establishment of an easement program does not result in increased regulatory scrutiny for participants, their neighbors, or others within an identified program One of the three goals for the program is to support the long-term viability of the ranching industry by providing incentives for conservation and cooperation. Therefore, we would not pursue a rangeland easement program if it had consequences such as these. In our view, anything that threatens the viability of ranching operations is a threat to the wildlife values these ranches provide. The overarching goal of the proposed easement program is to protect these wildlife values by providing another tool for ranchers interested in preserving their lands.

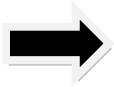
What is the relationship of the proposed CFLA to other efforts? A few individuals asked how the CFLA related to other conservation programs or initiatives.

Section 1.22 in this EA summarizes existing rangeland conservation programs and initiatives in California.

What is the planning process for the proposed CFLA? We received many questions and comments about the planning process for the proposed CFLA. These included questions about how the process would proceed, what issues will be addressed, and how other agencies and the public will be involved.

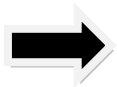
Answers to questions about the planning process can be found in Chapter 1 of this document.

What areas would be eligible for the proposed easement program and how would they be prioritized? Several commenters had questions about how we would prioritize lands for the proposed easement program, both at a broad scale and at a more local scale. Some respondents wanted to know if we targeted areas for their biological value. Many respondents suggested that the draft focal areas shared during the scoping period be expanded to include other areas.



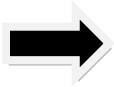
We conducted a broad-scale prioritization and analysis to identify general areas of privately-owned rangeland within the Rangeland Ring that have a high value to the Service's trust resources (migratory birds and threatened and endangered species). However, given the broad scale of this analysis, additional factors would be needed to prioritize parcels of interested landowners for potential easement acquisition. The Land Protection Plan (Appendix A) describes in detail how the draft program areas were selected and how lands of interested ranchers would be prioritized for potential easement acquisition.

How would the proposed easement program be implemented? We received a number of questions about how the proposed program would be implemented, including how landowners would be notified, the type of interests that would be acquired, and how acquisitions would occur.



Chapter 4 of the Land Protection Plan (Appendix A) describes how the proposed easement program would be implemented. Additional information about implementation is included in the Easement Q and A document in Appendix B.

What is the FWS's existing easement program like and how would the new program be managed? We received a few comments on the Service's existing wetland easement program in California, including: how long has it existed, how many acres are included, and how much does it cost to manage.



Our wetland easement program in the Central Valley has been ongoing for 32 years, during which we have acquired 333 easements representing 116,000 acres. We currently have three staff that monitor our six easement areas in the Central Valley and their salary is the primary cost of administering the program. Easement lands are not managed by the Service. Most of our wetland easements are on private duck clubs and the landowners manage the land to improve habitat for waterfowl. The Service monitors only the conditions of the easement over time. These conditions are established upfront and in partnership with landowners.

How could the proposed CFLA program change over time?

Once an easement is granted, it cannot change without the agreement of both parties. This provides a legally binding, permanent assurance to both the landowner and the Service that the easement restrictions will not change. In addition, the Service has worked hard to craft an easement template that is as specific as possible so there are no surprises to the landowner, now or in the future. The geographic scope (eligible counties) and easement acquisition goal for the CFLA program would not change in

the future without going through a new planning process. Priorities within approved program areas could change in the future if new data such as more accurate models of wildlife habitat values become available.

1.11 Existing Rangeland Conservation Efforts

Conservation easements funded and/or administered by conservation agencies and land trust organizations protect thousands of acres within the Rangeland Ring. These groups may have different objectives, focus areas, and/or partners, but all share the same core goal: to preserve California's rangelands for future generations. While not all-inclusive, this section highlights some programs that provide funds and/or facilitate conservation efforts in the Rangeland Ring. Currently, approximately 518,000 acres within the 14-million acre Rangeland Ring are permanently protected with conservation easements. Table 3 in Appendix A summarizes current easement holders within the Rangeland Ring. Figure 3 shows areas within the Rangeland Ring that are permanently protected through conservation easements.

1.11.1 Federal

The Farm and Ranch Lands Protection Program provides matching funds to keep productive farm and ranchland in agricultural uses. Working through existing programs, U.S. Department of Agriculture (USDA) partners with tribal, government, and non-governmental organizations to acquire farmland that, among other things, is: part of a pending offer from a State, tribe, or local farmland protection program; privately owned; large enough to sustain agricultural production; and has surrounding land that can support agricultural production.

Through easements or rental agreements, the Natural Resources Conservation Service Grassland Reserve Program targets vulnerable grasslands that are subject to conversion to urban uses, cropland, or other non-grazing uses. The program assists agricultural producers in protecting the viability of grazing landscapes; participants must limit future development and cropping uses of the grassland while retaining the right to conduct common grazing practices and operations related to the production of forage and seeding, subject to certain restrictions. The USDA's Farm Service Agency administers the program.

The Central Valley Project Conservation Program (CVPCP) and the Central Valley Project Improvement Act (CVPIA) Habitat Restoration Program (HRP) represent highly integrated efforts to restore and protect species and habitats impacted by the Central Valley Project. The CVPCP and HRP are managed cooperatively by the U. S. Bureau of Reclamation and the Service, and receive management input from the California Department of Fish and Wildlife. The CVPCP and HRP have funded several rangeland conservation easements in the foothills bordering the Central Valley.

The Partners for Fish and Wildlife Program is the Service's habitat restoration cost-sharing program for private landowners. The program was established to provide technical and financial assistance to conservation minded farmers, ranchers and other private (non-federal and non-state) landowners who wish to enhance fish and wildlife habitat on their land. The Partners for Fish and Wildlife Program emphasizes the restoration of historic ecological communities for the benefit of native fish and wildlife in conjunction with the desires of private landowners.

1.11.2 State

The California Wildlife Conservation Board (WCB) administers funds for the purchase of land and waters suitable for recreation purposes and the preservation, protection, and restoration of wildlife habitat. Two of the eight programs WCB manages are the California Rangeland, Grazing Land and Grassland Protection Program and the Oak Woodlands Conservation Program.

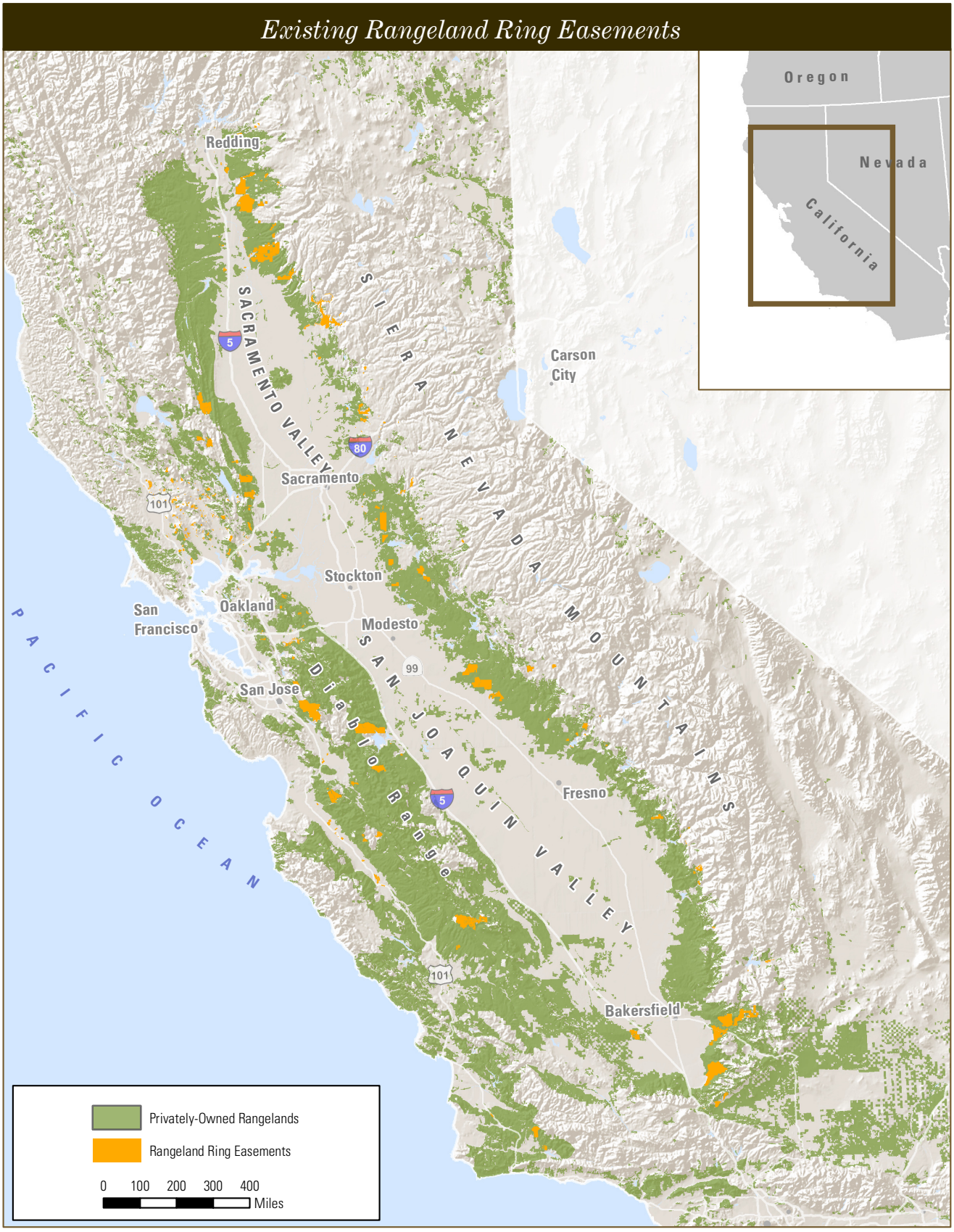


Figure 3. Existing Rangeland Ring easements.

Through the use of conservation easements, the California Rangeland, Grazing Land and Grassland Protection Program prevents the conversion of rangeland, grazing land, and grassland to non-agricultural uses; protects the long-term sustainability of livestock grazing; and ensures wildlife, water quality, watershed, and open-space benefits to the State from livestock grazing. WCB encourages projects that address regional landscape issues. Proposals with funding partners may receive higher priority than those requesting 100% of the funds to acquire an easement.

The Oak Woodlands Conservation Program is a grant program to protect and restore oak woodlands using conservation easements, and cost-share and long-term agreements. This program provides incentives to landowners, conservation organizations, cities, and counties for projects that conserve and restore California's oak woodlands while sustaining the economic viability of farming and ranching operations.

Since 1965, the Williamson Act (Act) has provided property tax relief for rangelands. Originally established to discourage unnecessary conversion of agricultural land to urban uses, the Act currently protects over 16 million of the State's 30 million acres of farm and ranch land. It is administered locally through a unique three-way relationship between private landowners, local governments, and the State. Contracts have a rolling 10-year term. Unless either party files a "notice of nonrenewal," the contract is automatically renewed for an additional year. In return, restricted parcels are assessed for property tax purposes at a rate consistent with their actual use, rather than potential market value. The Act is estimated to save agricultural landowners from 20% to 75% in property tax liability each year. In the past, the state has reimbursed counties for some of the lost revenue. However, since 2009 the state has effectively eliminated its payments to counties. Assembly Bill 2530, signed into law in October 2010, allows counties to voluntarily implement new contracts that are 10 percent shorter in return for a 10% reduction in landowners' property tax relief. The bill does not ensure the continuation of the Williamson Act beyond 2015 and its future is in question.

In November 2006, California voters passed Proposition 84 (Preservation of Ranches and Agricultural Lands Grant Program) for the protection and restoration of rivers, lakes and streams, their watersheds, and associated land, water, and other natural resources. The Sierra Nevada Conservancy (SNC) is administering $54 million of the Proposition 84 funds by funding local projects in partnership with eligible non-profits, tribes, and public agencies to preserve ranches and agricultural lands.

1.11.3 Land Trusts and Other Non-profit Organizations

Land trusts also play a critical role in preserving working rangelands through conservation easements. Most of the Federal and State programs described above grant funds to land trusts to acquire and hold easements. Land trusts active in the Rangeland Ring include regional, statewide, and national organizations that frequently partner on projects. They use donated easements, funded easements, mitigation easements, or a combination of the three to help protect open space, natural habitat, and agricultural values for future generations. Within the Rangeland Ring, at least 33 different land trusts hold easements totaling over 420,000 acres.

1.11.4 California Rangeland Conservation Coalition

The California Rangeland Conservation Coalition (CRCC) is a group of over 100 agricultural organizations, environmental interest groups, as well as state and federal agencies. The Service's Pacific Southwest Region and other signatories of the California Rangeland Resolution (http://www.carangeland.org/images/Rangeland_Resolution.pdf) have pledged to work together in the CRCC to preserve and enhance California's rangelands for species of special concern, while supporting the long-term viability of the ranching industry. The California Rangeland Resolution

recognizes that California rangelands and the diversity of species they support is largely due to grazing and other land stewardship practices of the ranchers that own and manage them. The CRCC Strategic Plan lays the foundation for Signatories to work together to target additional federal funding for conservation programs, coordinate permitting processes, garner support for cooperative conservation projects, fulfill research gaps, conduct outreach on the positive role of managed grazing, and provide incentives for ecosystem services. The proposed CFLA easement program would contribute to the CRCC strategic plan objective to "support locally-supported conservation easement programs funding and the voluntary use of conservation easements on private working rangelands."

1.12 Conserving Wildlife and Serving People: The U.S. Fish and Wildlife Service

The Service is the primary Federal agency responsible for conserving, protecting, and enhancing the nation's fish and wildlife populations and their habitats. It oversees the management and protection of migratory bird populations, restoration of nationally significant fisheries, enforcement of Federal wildlife laws, administration of the Endangered Species Act (ESA), and the restoration of wildlife habitat.

1.13 National Wildlife Refuge System and Authorities

Easements acquired within the CFLA would be administered by the Service's National Wildlife Refuge System (NWRS), whose mission is "…to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans" (National Wildlife Refuge System Improvement Act of 1997). The National Wildlife Refuge System consists mostly of lands owned (in fee-title) by the Service. However, working farms and ranches have been increasingly recognized for their important role in landscape conservation and the Service has entrusted its land management arm (the NWRS) with developing and administering easement programs that provide opportunities for interested landowners to maintain ownership of and protect their operations while being compensated for the conservation benefits their property provides. Nationwide, the Service has permanently protected nearly 2.5 million acres of these private working landscapes with conservation easements. In California alone, the Service has acquired conservations easements on over 116,000 acres. Our existing easement programs include Grasslands and Tulare Basin Wildlife Management Areas and San Joaquin River NWR in the San Joaquin Valley and North Central Valley, Butte Sink, and Willow Creek-Lurline Wildlife Management Areas in the Sacramento Valley. Together with our national wildlife refuges, these easement programs protect important habitat for native plants and many species of mammals, birds, fish, insects, amphibians, and reptiles. They also play a vital role in conserving threatened and endangered species. Refuges offer a wide variety of wildlife-dependent recreational opportunities, and many have visitor centers, wildlife trails, and environmental education programs. In contrast, CFLA easements would not offer public recreational uses but would be purchased for their inherent value to wildlife and protection of rangelands. Consequently, the NWRS offers a balance between public lands and private lands, all ultimately protected for wildlife.

The acquisition authorities for the proposed easements are the U.S. Fish and Wildlife Act of 1956 (16 U.S.C. 742a-j) and the National Wildlife Refuge System Administration Act of 1966 (16 U.S.C. 668dd-668ee), as amended. Easements would be acquired with funds appropriated from the Land and Water Conservation Fund, which is derived primarily from federal oil and gas leases on the Outer Continental Shelf, motorboat fuel taxes, and the sale of surplus federal property. The Service could also purchase certain easements through the use of duck stamp revenue from the Migratory Bird Conservation Fund. Easements acquired with these funds would be those that provide waterfowl habitat. Any easement acquisition would be from willing sellers and subject to available funding.

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Greg Bishop

Blue oak savannah

Chapter 2. Alternatives

The identification and evaluation of alternative ways of meeting the "purpose and need" of the proposed action is the core of the NEPA process and analysis. The Service is required to evaluate a range of alternatives to the proposed action. When there are potentially a very large number of alternatives, only a reasonable number of examples covering the full spectrum of alternatives must be analyzed. Additionally, for alternatives that were eliminated from detailed study, the Service must briefly discuss the reasons for their having been eliminated. We define a range of reasonable alternatives as those that substantially meet the "purpose and need" identified in Chapter 1. The alternatives consider the effects of a conservation easement program within the program area boundary identified in this EA, and also of not establishing an easement program (i.e., no action alternative).

This chapter describes three alternatives with descriptions and analyses below:

? Alternative A– No Action
? **Alternative B (Proposed Action) –** Acquire up to 200,000 acres of easements in four counties
? Alternative C – Acquire up to 325,000 acres of easements in six counties

Under the proposed action, ranches within a four-county program area would be eligible for the easement program. The total area of private rangelands in this four-county area is approximately 1.7 million acres. Thus, if 200,000 acres of easements were acquired, the Service in partnership with ranchers would protect up to 12% of rangelands in these counties (Figure 4).

Figure 4. Potential CFLA program areas.

2.1 Alternatives Development

With nearly 14 million acres of privately owned rangelands surrounding the Central Valley, it is important to prioritize areas for potential easement acquisition to ensure that our limited resources can be used to conserve the highest value areas for wildlife. To that end, the Service conducted a broad-scale prioritization and analysis of the Rangeland Ring. The goal of this analysis was to identify general areas of privately-owned rangeland within the Rangeland Ring that have a high value to the Service's trust resources. Trust resources are those resources for which the Service has been given specific responsibilities under federal legislation. Within the Rangeland Ring, the Service's trust resources include migratory birds and federally-listed threatened or endangered species.

The analysis consisted of the following major steps: 1) selecting conservation targets (priority species and habitats), 2) calculating the suitability of lands within the Rangeland Ring, 3) developing a network of potential priority areas that minimize "cost" and maximize value to the conservation targets; and 4) refining the priority areas based on the level of interest and support from landowners.

This broad-scale analysis utilized the most respected and widely-used conservation planning software tool available, Marxan (Ball *et al* 2009). This tool allows resource managers to evaluate a nearly limitless number of possible scenarios in order to find the arrangement or arrangements of potential priority areas to conserve that maximize benefits while minimizing cost. Another factor we used to formulate alternatives was the level of interest and support from landowners in different parts of the Rangeland Ring. This was based on feedback we received from individual landowners and groups representing landowners during and subsequent to the public scoping period. Counties with a comparatively high level of rangelands considered important for conservation and high degree of landowner interest were included as potential program areas in the alternatives. It should be noted that the analysis does not provide an answer of which specific areas to conserve. The outputs of the analysis are meant to be used as a general framework that will guide the conservation process. Therefore, additional factors would be used to prioritize parcels of interested landowners for potential easement acquisition. These factors are listed in the "Project Implementation" section of Appendix A.

2.2 Actions Common to All Alternatives

Alternative A is the "no action" alternative under which the Service would not acquire easements in the CFLA, whereas Alternatives B and C propose new Service activities through the use of conservation easements in select program areas. The administration of conservation easements would be the same in both Alternative B and C. The essential aspects of administration are described in Alternative B below, which also apply to Alternative C. Implementation of either Alternative B or C would fulfill the goals of the CFLA as noted in Chapter 1 – Purpose and Need to protect rangeland habitat, contribute to the recovery of threatened and endangered species, and support the long-term viability of ranching.

2.3 Alternative A – No Action

This alternative simply means the Service would not begin this easement program in the CFLA (Table 1 and Table 2). Existing habitat enhancement and restoration programs would continue to be implemented in partnership with interested ranchers, where feasible and where funds exist (e.g., USFWS Partners for Fish and Wildlife Program, USDA Environmental Quality Incentive Program). Current Service programs such as Partners for Fish and Wildlife (PFW) would continue within the conservation project area, keeping in mind that this program does not offer permanent protection but only habitat restoration. Water developments, grazing systems, and grassland management could continue through cooperative efforts with private landowners. Private efforts by land trusts and others would continue to secure conservation easements, but with limited resources most rangelands within the Rangeland Ring would lack any form of permanent protection. If recent trends continue as expected, many ranches with high wildlife value would be converted to other land uses and their

habitat values would be permanently lost. In determining the effect of "no action," we summarize the most likely future that could be expected to occur in the absence of the CFLA.

2.4 Alternative B – Four-County CFLA Program Area (Proposed Action)

Under Alternative B, we would launch a new conservation easement program focused on rangelands bordering the Central Valley, within the central and southern Sierra Nevada foothills and the central Diablo Range. Program eligibility would be limited to foothill rangelands within Merced, Mariposa, Stanislaus, and Tulare counties (Figure 4; Table 2.1 and Table 2.2). Within the program area, the Service would seek to acquire up to 200,000 acres of perpetual rangeland conservation easements of high-quality habitat value from willing sellers. The program will not involve fee-title acquisitions.

The easement contract would specify perpetual protection of habitat for trust species and would restrict development to protect and maintain existing rangeland. Grazing and other ranching operations would continue on lands included in the easement contract. All land encumbered by an easement would remain in private ownership and, therefore, property tax and management activities would remain the responsibility of the landowner. Public access to the land also would remain under the control of the landowner. Easement restrictions may include, but are not limited to, preventing development (residential, commercial, and industrial), altering the natural topography, converting grassland or other natural vegetation to cropland, and draining wetlands.

Easements within Merced, Mariposa, and Stanislaus counties would be managed by staff located at the San Luis National Wildlife Refuge Complex, Los Banos, California. Easements within Tulare County would be managed by staff located at Kern National Wildlife Refuge Complex, Delano, California. Service staff would be responsible for monitoring and administering all easements on private land. Monitoring will include periodically reviewing land status through correspondence and meetings with the landowners or land managers to ensure that the conditions of the conservation easement are being met. Documentation would be used at the time the easements are established to document baseline conditions.

Table 2-2 summarizes the estimated easement acquisition acreage by county. The program area boundary and acquisition estimates for each county are based on a broad-level analysis of the entire Rangeland Ring, coupled with the level of landowner interest. However, individual ranches submitted by landowners for consideration would be prioritized based on site-specific factors, including:

- Documented presence of priority species and/or habitats
- Acreage of parcel(s)
- Level of conversion threat in region
- Presence of features that promote resilience to climate change (e.g. elevation range, presence of permanent water sources, presence of forested riparian corridors)

The Land Protection Plan (Appendix A) describes these prioritization methods in more detail.

2.5 Alternative C – Six-County CFLA Program Area

Under Alternative C, we would launch a new conservation easement program focused on rangelands bordering the Central Valley, within the central and southern Sierra Nevada foothills and the central Diablo Range. This alternative would simply expand the area beyond that described in Alternative B, but all other aspects of Alternative B would be incorporated into Alternative C. In addition to the eligible program counties under Alternative B (Merced, Mariposa, Stanislaus, and Tulare counties), Alternative C would include rangelands within San Benito County and Sierra Nevada foothills of Kern County (Figure 4; Table 2.1 and Table 2.2). Within the Alternative C program area, the Service would seek to acquire up to 325,000 acres of rangeland conservation easements from willing sellers.

Table 2.1 - Summary of Potential Easement Program Areas

Rangeland Areas	*Alternative A*	*Alternative B (Proposed Action)*	*Alternative C*
Central Sierra Foothills (>200 ft elev)	none	Merced Mariposa Stanislaus	Merced Mariposa Stanislaus
Southern Sierra Foothills (>500 ft elev)	none	Tulare	Tulare Kern
Diablo Range (>200 ft elev)	none	Merced Stanislaus	Merced Stanislaus San Benito
Total Easement Acquisition Goals (acres)			
	0	200,000	325,000

Table 2.2 - Summary of Estimated Easement Acquisition Acreage by Eligible County

County	*Alternative A*	*Alternative B (Proposed Action)*	*Alternative C*
Tulare	0	35,000	35,000
Mariposa	0	35,000	35,000
Stanislaus	0	60,000	60,000
Merced	0	70,000	70,000
Kern	0	0	55,000
San Benito	0	0	70,000
TOTAL	0	200,000	325,000

The program will not involve fee-title acquisitions. Program administration would be the same as under Alternative B.

2.6 Alternatives Considered But Not Studied in Detail

The Service considered three other alternatives in addition to the three described above but chose not to analyze them in detail for various reasons. Below is a description of each alternative and the reason why it was not analyzed in detail.

2.6.1 Fee-title Acquisition

It is the long-established policy of the Service to acquire minimum interest in land from willing sellers to achieve the Service's habitat protection goals. Fee-title acquisition is not preferable to the use of conservation easements, nor is this method of acquisition necessary to conserve rangeland habitats and their associated wildlife resources.

Longstanding communications the Service has had with ranchers and ranching interests indicate no general support for the Service protecting rangelands through fee-title acquisitions in California. Little to no public support was expressed for the possibility of fee-title acquisition by the Service in public meetings and correspondence received for the CFLA proposal. Additionally, fee-title acquisition would encumber the Service to staff and manage rangelands it has acquired, while displacing local ranchers with rangeland management expertise from continuing to manage this unique landscape. The initial cost associated with fee-title acquisition would be two to three times

higher than the purchase of conservation easements. In addition, there would be substantial annual costs for staffing and materials needed by the Service to manage fee-title land. The much higher costs associated with this method would result in limiting acquisition to a much smaller area, making landscape-scale conservation unlikely. Consequently, this alternative was not studied further.

2.6.2 Replace Williamson Act Payments to Counties

The California Land Conservation Act of 1965 (commonly referred to as the Williamson Act) is a land conservation program. Private landowners sign contracts with counties, promising to keep their land in agricultural use for set periods of time in exchange for a significant reduction in property taxes. In the past, the State then paid the affected counties for some of the lost revenue (subvention payments). However, since 2008, the State has not made any payments to the counties. In October 2010, Assembly Bill 2530 was signed into law, allowing counties to voluntarily implement new contracts that are 10% shorter in return for a 10% reduction in the landowner's property tax relief. During the public scoping period, it was suggested that the Service could make payments to the counties to offset the loss of subvention payments from the State. This alternative was not pursued further because the Service has no legal authority for making such payments. Though tax relief provided by the Williamson Act is critical to rangeland conservation in California, the contracts provide short-term protection and do not prevent the conversion of rangeland to more intensive agricultural uses such as orchards and vineyards.

2.6.3 Grants for Easements held by Land Trusts

Several organizations and individuals have asked if the Service can grant funds to third parties such as land trusts for easements. While this may be done with other funding granted through the Service (e.g., North American Wetland Conservation Act grants, and the Cooperative Endangered Species Conservation Fund's Habitat Conservation Plan and Recovery Land Acquisition grants), the proposed CFLA would be funded by the Land and Water Conservation Fund and the Migratory Bird Conservation Fund, which do not allow for such an arrangement. Congress mandates that only the federal government is authorized to hold easements funded by these sources. However, we are exploring options to work with third parties such as land trusts to do outreach and monitoring for the program.

2.6.4 Larger and Smaller Project Areas

During initial scoping, the Service identified four preliminary focal areas: Sierra Foothills, Tehama Foothills, San Benito Hills, and Sequoia Foothills. Based on public scoping comments and further analysis, we determined the need to have a more geographically focused effort. These focal areas, although clearly in need of conservation, require further refinement, as they represent a more diffuse and potentially less efficient effort by the Service when considering expectations for current and future resources and staffing. Alternative C is scaled back from the original CFLA concept yet offers a reasonable and achievable approach to rangeland conservation. Conversely, launching an easement program less than 200,000 acres would significantly minimize the Service's ability to contribute to the protection of rangeland habitats that are critically important to wildlife. Consequently, alternatives for larger and smaller program areas/easement acreage goals were not studied any further.

2.6.5 Term Easements

During the public scoping period, we received comments suggesting that we consider term easements. Term easements differ from perpetual easements in that the restrictions are in force for a limited period of time (typically 10 - 30 years), rather than permanently. Nationwide, the Service has occasionally purchased term conservation easements to protect areas important to wildlife. However, the vast majority of easements we have purchased are perpetual. When comparing the costs and long-term benefits of term and perpetual easements, we determined that perpetual easements are the most economical way to achieve our wildlife conservation mission.

Tracy Schohr

Cattle grazing in an oak woodland.

Chapter 3. Affected Environment

This chapter describes the resources that may be affected by implementing the alternatives discussed in Chapter 2 of this draft EA. It describes the Rangeland Ring and potential CFLA program areas' physical, biological, and socioeconomic environment. These descriptions enable judgments as to the beneficial or adverse consequences (re: Chapter 4 – Environmental Effects) of the proposed CFLA conservation alternatives (re: Chapter 2) within a regional and specific environmental context. Beyond the descriptions herein, readers also are encouraged to explore other references that address the physical, biological, and socioeconomic environment in the Rangeland Ring. Relevant information is provided in the California Wildlife Action Plan: Wildlife – Conservation Challenges (CWAP) (California Department of Fish and Game 2007), websites hosted by the agency now named California Department of Fish and Wildlife (e.g., http://www.dfg.ca.gov/), and the California Native Plant Society (http://www.cnps.org/cnps/rareplants/cnddb.php). The CWAP provides a comprehensive description of the state's fish and wildlife, historic and current habitat trends, species and habitat threats, water quality, education programs, and other similar topics.

3.1 Physical Environment

The area of analysis is the Rangeland Ring, consisting off the foothills surrounding California's Central Valley. Areas of focus within the Rangeland Ring are the potential program areas located within the following counties: Merced, Mariposa, Stanislaus, Tulare, San Benito, and Kern. The Rangeland Ring lies within five different sections of the Pacific Mountain System physiographic region. On the west side of the Central Valley, the Coast Ranges fall within the California Coast Ranges section. On the east side of the Valley, the lower foothills are within the California Trough section. Higher foothills and mountains are within the Sierra Nevada section to the east, the Southern Cascade Mountains section on the north-east, and the Klamath Mountains section to the north.

3.1.1 Geology and Topography

The flatness of the Central Valley floor contrasts with the gentle foothills or rugged mountains that are typical of most of California's terrain. It consists largely of material eroded from the Sierra Nevada Mountains and foothills to the east and the Coast Ranges and foothills to the west and deposited in low alluvial fans. The Central Valley is an elongated alluvial basin, about 450 miles long, 75 miles wide, covering an area of 22,500 square miles, and encompassing in whole or part 19 counties. It is often subdivided into the Sacramento Valley in the north and San Joaquin Valley in the south. Topography is relatively flat throughout the Valley, with elevation ranging from 400 feet in the north and south to below sea level near San Francisco Bay. Boundaries of the Valley are not precisely defined since valley grasslands grade into oak-grassland savannas of the foothills everywhere except in the south where desert conditions exist (Schoenherr 1992).

The Valley is thought to have originated below sea level as an offshore area depressed by subduction of the Farallon Plate into a trench further offshore. The San Joaquin Fault is a notable seismic feature of the Central Valley, illustrating extreme differences between the geology of the valley floor and that of the rugged hills of the Coast Ranges. The valley was later enclosed by the uplift of the Coast Ranges, with its original outlet into Monterey Bay. Faulting moved the Coast Ranges, and a new outlet developed near what is now San Francisco Bay. Over the millennia, the valley was filled by the sediments of these same ranges, as well as the rising Sierra Nevada to the east; that filling eventually created an extraordinary flatness just barely above sea level. Before California's massive flood control and aqueduct system was built, the annual snow melt turned much of the Valley into an inland sea (Benke 2005, Faunt 2009).

The Sierra Nevada Mountains and the Coast Ranges frame the Valley to the east and west, respectively. The Sierra is a tilted fault block nearly 400 miles long. Its east face is a high, rugged multiple scarp, contrasting with the gentle western slope (about 2°) that disappears under sediments of the Great Valley. Deep river canyons are cut into the western slope. The band of metamorphic bedrock known as the Mother Lode Belt runs along most of the lower foothill elevations of the western slope north of the San Joaquin River. The Coast Ranges are northwest-trending mountain ranges (2,000 to 4,000, occasionally 6,000 feet elevation above sea level) and valleys. The ranges and valleys trend northwest, subparallel to the San Andreas Fault. To the west is the Pacific Ocean. The Coast Ranges are composed of thick Mesozoic and Cenozoic sedimentary strata. The northern and southern ranges are separated by a depression containing the San Francisco Bay (California Geologic Survey 2002).

3.1.2 Mineral & Energy Resources

Based on the U.S. Geological Survey's (USGS) preliminary data for 2007, California ranked third behind Arizona and Nevada in non-fuel mineral production, accounting for approximately 6.3% of the nation's total. The market value of mineral production for California was $4.3 billion. California produced about 30 different industrial minerals during the year. California led the nation in the production of sand and gravel, portland cement, diatomite and natural sodium sulfate, and was the only producer of boron and rare earths. The state ranked second behind Florida for masonry cement. The only metals produced were gold and silver. California ranked 6th in gold production out of nine states that reported for the year. Other minerals produced include common clay, bentonite clay (including hectorite), crushed stone, dimension stone, feldspar, fuller's earth, gemstones, gypsum, iron ore (used in cement manufacture), kaolin clay, lime, magnesium compounds, perlite, pumice, pumicite, rare earths, salt, silver, soda ash, and zeolites. There were about 660 active mines producing non-fuel minerals during 2007. Approximately 10,000 people are employed at these mines and their processing plants (Kohler 2007).

Prominent minerals within the program area are sand and gravel (Merced and Stanislaus counties), crushed and dimension stone (Mariposa County), sand and gravel and crushed stone (San Benito,

Tulare, and Kern counties), and gypsum, sulphur, Fuller's earth, shale, gold, silver, cement, limestone, and borates in Kern County (USGS 2008).

The Monterey/Santos shale formations are located in the San Joaquin and Los Angeles Basins and covers approximately 1,752 square miles. The San Joaquin Basin portion of the formation extends along the west side of the San Joaquin Valley and Inner Coast Range from Stanislaus County south to southern Kern County. In total, the Monterey/Santos shale formations are estimated to contain 15 billion barrels of oil, two-thirds of the continental United States' total deep-rock deposits (EIA 2011).

The 34,000-acre Tehachapi Wind Resource Area is considered the largest wind resource area in California and is located at the southern end of the San Joaquin Valley and part of the adjacent Mojave Desert. Wind power plants in this area generate over 40 percent of California's wind energy and produce more power than any other wind development in the United States. In the Tehachapi/Mojave area, most of the existing 3,400 wind turbines that produce about 710 megawatts of power are located in the TWRA. Expansion plans are underway and officials estimate that it will eventually provide 4,500 megawatts of electricity, which could make it the largest wind project in the nation. The new wind farms are expected to eventually add between 1,750 and 2,000 turbines to the area (PUC and USFS 2010).

3.1.3 Soils

The types and distribution of soils in the Rangeland Ring have an important influence on the distribution of plant communities and habitats available for wildlife. Soil elements such as calcium, nitrogen, phosphorus, and potassium are the principle nutrients needed by plants.

Within the Rangeland Ring, common soil orders include Alfisols, Mollisols, Entisols, and Inceptisols. Soils in the Sierra Nevada foothills have developed from parent materials ranging from sedimentary and meta-sedimentary in the north to granitic in the south. These soils are typically shallow (< 3 ft) and relatively acidic (pH 5.5-7). Soils of the central Coast Range are mostly derived from marine and nonmarine sedimentary rocks such as mudstone, shale, and sandstone. Alfisols are moderately weathered soils that are typical of oak woodlands and grasslands. They are common on saddles and ridge tops in the Sierra Nevada foothills and Coast Ranges, as well as the old terraces on the margins of the Central Valley. Many of the old terrace soils along the eastern margin of the Central Valley contain clay pans and hardpans that support vernal pool landscapes (O'Geen *et al*. 2007, Jackson *et al*. 2007). Mollisols are soils that have accumulated highly decomposed organic matter in the topsoil. They are common in the Central Coast Range and southern Sierra foothills where they are found on stream terraces of narrow canyons and valleys and steeply sloping hillsides. Entisols are mineral soils that lack distinct horizons. They are common on the central portion of the Inner Coast Range and occur in areas with dunes, alluvial fans, washes, recent volcanic materials, and on very steep slopes. Inceptisols are young soils that are frequently found on steep terrain with chaparral and young stream terraces. They are common in the central and northern Sierra Nevada foothills (O'Geen *et al*. 2007; Jackson *et al* 2007).

3.1.4 Hydrology and Water Quality

The Rangeland Ring, including the potential program areas, is located in the Central Valley watershed which drains a total of 22,500 square miles. Two major river systems drain and define the north and south Central Valley: Sacramento River (north) and San Joaquin River (south). In terms of watersheds, the Central Valley is encompassed by the Sacramento River watershed (14,714 sq. miles), the San Joaquin River watershed (18,020 sq. miles), and the Tulare Lake watershed (18,232 sq. miles). The Sacramento River watershed stretches from roughly the northeast corner of California to Sacramento County. The San Joaquin River watershed encompasses the area from Sacramento County to Madera County (and portions of Fresno County). The Tulare Lake watershed includes most of Fresno County, all of Kings and Tulare counties, and all but the eastern fifth of Kern County. These large watersheds together include 28 individual watersheds. Prominent rivers in the San Joaquin

River watershed include the Stanislaus, Tuolumne, Merced, Kaweah, King, and Kern rivers, which drain to the San Joaquin River. Numerous perennial tributaries (1,256 named tributaries; 7,153 miles), and intermittent (seasonal) streams (36,567 miles) drain into these rivers.

Tony Immoos

Intermittent foothill stream

Draining the western slopes of the Sierra Nevada and crossing its foothills is a series of rivers of varying size. In the north, the Pit River and the Sacramento River combine to flow the length of the Sacramento Valley, through the Delta area, and into San Francisco Bay. At intervals along the way other streams empty their waters into the Sacramento. Some of these are the Feather, Yuba, Bead, and American rivers—streams of considerable size—along with a host of lesser creeks that drain small watersheds. South of the Delta lies the San Joaquin Valley. Streams coming from the mountains into the northern two-thirds of the San Joaquin Valley empty into the San Joaquin River and drain northward to join the Sacramento just before emptying into San Francisco Bay. In the southern one-third of the Valley, rivers and streams lie in a closed basin and have no natural drainage to the ocean, and thus empty into Tulare and Buena Vista lakes. Most of the major streams are fed by melting snow from the high slopes of the Sierra Nevada. Streamflow continues well into or throughout the arid summer months (National Climatic Data Center 2012).

Most of the streams have been dammed to hold the water supply in reservoirs for irrigation, industrial, and domestic uses throughout the dry part of the year, and to provide flood control during the winter and spring. Most major water supply, hydropower, and flood control reservoirs in the Sierra Nevada are located in the middle to low foothill elevations while the natural lakes are typically in the high elevation zone. The largest reservoir in the Rangeland Ring is Lake Oroville, which is the largest reservoir of the State Water Project (SWP). Most of the water stored in reservoirs is used at least once before draining to the sea or percolating into underground storage (DWR 2009).

Groundwater conditions throughout the Rangeland Ring are controlled by the distribution of bedrock versus unconsolidated deposits; primarily in mountainous terrain where only groundwater-bearing units are in fractured bedrock. Modern groundwater development in the Rangeland Ring is primarily in the form of private wells. There are groundwater quality issues within some fractured hard rock areas due to either natural (e.g., uranium, radon, heavy metals) and human-induced (e.g. bacteria, nutrients) causes. Most of the groundwater basin areas within the Rangeland Ring are very small, discrete regions along the eastern fringe of vast groundwater basins in the Sacramento and San Joaquin valleys or in structural basins between the Sierra Nevada and Tehachapi mountains. Along the entire east fringe of the San Joaquin Valley the groundwater basins have been adversely affected by overdraft for decades, resulting in depressed groundwater levels, ground subsidence, and loss of aquifer storage capacity. Management efforts, including artificial recharge and water banking (Kern County basin), have supported partial recovery of groundwater levels. In the Tehachapi Valley the groundwater basins are adjudicated and artificial recharge programs are in place to help address groundwater declines that were noticed as early as the 1940's (DWR 2003).

The Sierra Nevada foothills are a critical element of state-wide water resource use and management, as they comprise over half of the Mountain Counties source area, and contain nearly all of the large and critical reservoirs (outside of the Coast Ranges). Further, their location is key for water

conveyance and transfers (e.g., from the South Central Subregion to the San Francisco Bay Area; from the Tulare Lake basin north via the Friant-Kern canal). Water resource planning efforts across California have progressed in the last decade, with a growing emphasis on collaboratively managing all aspects of water-related issues within the Integrated Regional Water Management (IRWM) process.

Major water quality impacts on the Sierra include impairment of chemical water quality downstream of urban centers, mines, and intensive land-use areas; the accumulation of near toxic levels of mercury in many low- to middle-elevation reservoirs of the western Sierra; widespread biological contamination by human pathogens (especially Giardia); and increased salinity in east-side lakes as a result of water diversions. Riparian areas have been damaged extensively by placer mining (northern and west-central Sierra) and intensive grazing (Sierra-wide) and locally by dams, ditches, flumes, pipelines, roads, timber harvest, residential development, and recreational activities. Excessive sediment yield into streams remains a widespread water quality problem in the Sierra Nevada. The main sources of sediments are roads of poor design, location, construction, and maintenance, as well as riparian areas that have been devegetated by logging, fire, intensive grazing, mining, and construction (Centers for Water and Wildland Resources 1996). Historical mercury mining in the Coast Ranges and use of mercury to amalgamate gold on the Sierra side have resulted in substantial mercury loads discharged to the Central Valley waterways (DWR 2009).

3.1.5 Present Climate

The northern Central Valley (Sacramento Valley) has a hot Mediterranean climate and the more southerly parts (San Joaquin Valley) exist in a rain shadow zone that are dry enough to be Mediterranean steppe (near Fresno) and even low-latitude desert (near Bakersfield). It is hot and dry during the summer and cool and damp in winter, when frequent ground fog, known regionally as "tule fog," occurs. Summer daytime temperatures routinely approach 100°F (38°C), and heat waves commonly bring temperatures exceeding 115°F (46°C). Frost occurs at times in the winter months, but snow is extremely rare (National Climatic Data Center 2012).

Climate in the foothills is greatly affected by the contrasting topography of the Central Valley and its bounding Coastal and Sierra Nevada mountain ranges. Isotherms run mostly north-south, parallel to the contours of the mountains. With increasing distance from the ocean the maritime influence decreases in the western foothills of the San Joaquin Valley, resulting in a more continental type of climate with warmer summers, colder winters, greater daily and seasonal temperature ranges, and generally lower relative humidity. Moist air sometimes drifts northward during the warm months from the Gulf of Mexico or the Gulf of California causing scattered, locally heavy showers mostly over the desert and mountain portions of the state. The high pressure system off the California Coast decreases in intensity in winter permitting storms to move into and across the state, producing widespread rain at low elevations and snow at high elevations. The Sierra Nevada forms a barrier that protects much of California from the extremely cold air of the Great Basin in winter. The Coastal Ranges to the west offer some protection to the interior from the strong flow of air off the Pacific Ocean. As a result, precipitation is heavy on the coastal or western side of both the Coast Ranges and the Sierra Nevada and lighter on the eastern slopes. Between the two mountain chains and over much of the desert area the temperature regime is intermediate between the maritime and the continental models (National Climatic Data Center 2012).

Mid-autumn to mid-spring comprises the rainy season, although during the late summer, southeasterly winds aloft can bring thunderstorms of tropical origin, mainly in the southern half of the San Joaquin Valley but occasionally to the Sacramento Valley. The northern half of the Central Valley receives greater precipitation than the semi-desert southern half. Average annual precipitation in the Sierra foothills varies from rather low amounts (<12 inches per year) along the San Joaquin Valley floor south of Merced County and in the Tehachapi Mountain basins, to moderate amounts (20-25 inches per year) along most of the Sacramento Valley margin. Average annual

precipitation is lowest in the southern watersheds: ~22 inches per year for the Kern River basin, and ~35-40 inches per year for the Tule, Kaweah, Kings and San Joaquin river basins. The highest precipitation amounts are in the Central and North Central foothill areas, with annual values from ~48 inches per year in the Bear and Feather river basins to >65 inches per year in the Yuba River basin. Precipitation generally increases moving north, but there is some variability that is influenced by the watershed crest elevations and position relative to regional atmospheric circulation patterns and gaps in the Coast Ranges (Null *et al.* 2010, Hunter *et al.* 2011).

3.1.6 Climate Change

Climates change periodically and regularly, although time-frames typically are very long. Change is influenced by a number of major factors including the shape of the Earth's orbit, orientation of the Earth's tilt or axis, its wobble (precession) around its axis, changes in solar intensity, emissions from volcanic eruptions, and even continental plate tectonics. These climate change "drivers" often trigger additional changes or "feedbacks" within the climate system that can amplify or dampen the climate's initial response to them (whether the response is warming or cooling). These changes include glacial (cold) and interglacial (warm) periods, increases and decreases in the Earth's solar reflectivity, and changes in global ocean currents.

When the Earth's orbit changes to a more elliptical shape, it triggers a cold glacial period, and conversely, when the orbit is more circular it promotes a warm (or interglacial) period. Increasing concentrations of carbon dioxide may amplify the warming by enhancing the greenhouse effect. When temperatures become cooler, CO2 enters the ocean thus minimizing the greenhouse effect and contributes to additional cooling. During at least the last 650,000 years, CO2 levels have tended to track the glacial cycles (Janzen *et al* 2007, EPA 2012).

There is a growing body of evidence, however, to support the theory that the historically recent unprecedented high levels of greenhouse gases being released through human activities (e.g., CO2 released from fossil fuel combustion and biomass decomposition via extensive global deforestation, and NO2 released from petro-fertilizers applied extensively on croplands) greatly exacerbate the influences noted above, anthropogenically raising average global temperatures and causing changes in the global climate due to a stronger greenhouse effect. Climate change transcends the Service and the National Wildlife Refuge System and poses one of the largest conservation threats of the 21st century. Climate change has very likely increased the size and number of wildfires, insect outbreaks, pathogens, disease outbreaks and tree mortality in the interior West, the Southwest and Alaska. In the aquatic environment, evidence is growing that higher water temperatures resulting from climate change are negatively impacting cold- and coolwater-adapted populations across the country. Rising sea levels have begun to affect fish and wildlife habitats, including those used by shorebirds and sea turtles that nest on coastal national wildlife refuges. Ocean acidification and coral bleaching represent major threats to marine life in more than 50 million acres of Refuge waters and beyond. These concerns generally will be addressed by the Service with two recently released reports: "Rising to the Urgent Challenge: Strategic Plan for Responding to Accelerating Climate Change (USFWS 2010) and "Conserving the Future: Wildlife Refuges and the Next Generation (USFWS 2011).

Climate change will affect ecological communities and wildlife species throughout California. Current climate models predict overall temperature increases of between 4-10.5oF by the end of the century, accompanied by hotter, drier summers and warmer, wetter winters (Hayhoe 2004, Schneider and Duriseti 2002, Turman 2002). Rising temperatures and altered precipitation patterns will result in changes in plant communities and reduced habitat suitability for some wildlife species. Some communities and species may shift to higher elevations or latitudes, but this will become ever more challenging as remaining natural areas shrink and the gaps between habitats grow. Throughout the

state, drier summers may also increase fire frequency and intensity. Climate change effects will be especially disruptive in the Sierra Nevada and Cascades, the Central Valley, and the Bay-Delta region (Mount and Twiss 2005).

The flora of California, a global biodiversity hotspot, includes 2,387 endemic plant taxa. With anticipated climate change, it is estimated that up to 66% will experience >80% reductions in range size within a century. These results are comparable with other studies of fewer species or just samples of a region's endemics. Projected reductions depend on the magnitude of future emissions and on the ability of species to disperse from their current locations. California's varied terrain could cause species to move in very different directions, breaking up present-day floras. However, these estimated projections also identify regions where species undergoing severe range reductions may persist. Protecting these potential future refugia and facilitating species dispersal will be essential to maintain biodiversity in the face of climate change (Loarie *et al.* 2008).

In the Sierra Nevada, warmer temperatures will reduce the annual snowpack and result in earlier snowmelt. Spring and summer streamflows are projected to decline by as much as 25% by 2050 and 55% by the end of the century (duVair 2003). Regional climate models project mean annual temperature increases of 3.2–4.3°F and a decrease in mean annual rainfall of roughly 3-13 inches by 2070. The projected impacts of climate change on thermal conditions in the Sierra Nevada will be warmer winter temperatures, earlier warming in the spring, and increased summer temperatures. The magnitude of warming will likely vary at a very fine spatial resolution due to the topographic diversity of this ecoregion. Projected declines in water availability, already underway, will have profound consequences for water use and conservation of endangered fish and wildlife. Additionally, there is general consensus that increasing CO2 levels will result in larger and more intense fires in a number of vegetation types in the Sierra Nevada. The threats to wildlife include:

- Shifts in vegetation communities: loss of existing grasslands to drier grassland and desert scrub communities combined with conversion of conifer dominated vegetation to grassland and oak/pine vegetation at higher elevations; these vegetation conversions may hasten fire severity and frequency throughout the current and future grassland communities in the Rangeland Ring.
- Potential thermal stress may be possible at the lowest elevations and/or for species with very narrow temperature tolerance levels.
- Reduced and degraded habitat for some wildlife associated with riparian areas.
- Disruption in peak streamflows impacting sensitive aquatic species and their life history.

In the San Joaquin Valley, regional climate models project mean annual temperature increases of 2.5 –3.3°F by 2070, and consequent warmer winter temperatures, earlier warming in the spring, and increased summer temperatures. Regional climate models project a decrease in mean annual rainfall of 1-3 inches by 2070. Since much of the San Joaquin Valley is in agriculture or developed, changes in land management and land use will be more important than natural shifts in vegetation. Grasslands are projected to decrease by 6-11% by 2070. Hydrologic conditions in vernal pools were found to be sensitive to warming, and in the absence of habitat loss, warmer temperatures and would drive vernal pools toward longer, more frequent periods of inundation (Pyke 2005). The threats to wildlife include:

- Changes in water availability, complicated by water allocation decisions, for agriculture adapted wildlife.
- High temperature events will become more common, and may result in thermal stress for species with narrow temperature tolerance levels at one or more life stages.
- Increase flooding and impacts to society and wildlife (Das *et al.* 2011).

3.1.7 Air Quality

The Federal Clean Air Act (42 U.S.C. §§ 7401, as amended) mandates the establishment of ambient air quality standards and requires areas that violate these standards to prepare and implement plans

to achieve the standards by certain deadlines. The deadline for attaining both the ozone (O3) and carbon monoxide (CO) standards was August 31, 1988. Areas that do not meet Federal primary air quality standards are designated as "nonattainment" areas. Areas that comply with Federal air quality standards are designated as "attainment" areas. Attainment and nonattainment designations are pollutant specific. The Federal Environmental Protection Agency (EPA) sets health protection standards for eight "criteria pollutants," including CO, O3, lead (Pb), nitrogen dioxide (NO2), sulfur dioxide (SO2), particulate matter, and sulfates.

The majority of the potential program areas (all but San Benito County) are within the San Joaquin Valley air basin, which is designated an extreme nonattainment area for O3, and serious nonattainment areas for fine particulate matter (PM2.5). While promising reductions in some pollutants have been achieved, levels of O3 and fine particulate matter remain high. Between 2005 and 2007 ambient O3 levels in the San Joaquin Valley exceeded the health-based 8-hour National Ambient Air Quality Standard (NAAQS) 112 to 139 days per year. Ozone levels are typically elevated in the warmer months, suggesting that air is unhealthful on most summer days in these regions. Additionally, between 2005 and 2007 the maximum 8-hour concentration was significantly above the standard. While O3 levels in much of California have fallen steadily over a period of years, progress in the San Joaquin Valley has been slower than in other major air basins. To meet the maximum 24-hour standard, fine particulate levels must fall by more than 50%, and annual average concentrations must fall by nearly 30%. These health-based standards will be very difficult to achieve (Hall *et al.* 2008).

Air quality in the Sierra foothills exhibits extremes. At times, the air quality in the northern Sierra Nevada is among the cleanest in the world. But farther south along the west side, ozone and small particulates from Central Valley sources creep up the mountainside, resulting in some of the worst air quality in the nation. Extensive damage to sensitive tree species is occurring at low and middle elevations (Centers for Water and Wildland Resources 1996).

3.2 Biological Environment

This section describes the fish, wildlife, and plant species and communities of the Rangeland Ring, including the proposed program areas. A number of sources were used but it is important to recognize a few general sources that provide comprehensive species and habitat information. More detailed information can be found within the Wildlife Habitat Relationships System Database (http://www.dfg.ca.gov/about/data.html) and the *California Wildlife: Conservation Challenges (2006)*, both products of the California Department of Fish and Wildlife. Additionally, comprehensive information on fish can be obtained through the *California Fish Website* (http://calfish.ucdavis.edu/) maintained by the University of California, Davis. The California Native Plant Society's "Inventory of Rare and Endangered Plants" has provided detailed information about California's rare plants for over 35 years, and plays a significant role in promoting conservation (http://www.cnps.org/cnps/rareplants/inventory/). Information on California oak woodlands is available from the *"California Oak Management"* website, University of California, Davis (http://ucanr.edu/sites/oak_range/).

3.2.1 Vegetation

The Rangeland Ring falls within the California Floristic province, one of 25 biodiversity hotspots identified worldwide (Myers *et al* 2000). The 14 million-acre study area is composed largely of privately-owned rangeland. The predominant landcover class within the Rangeland Ring is grassland which accounts for about 57% of the area. In general, annual grassland occurs on the edges of the valley floor and lower elevations of the foothills. Woodland classes generally occur above the annual grassland and cover about 28% of the Rangeland Ring and include blue oak, blue oak-foothill pine, coastal oak, and montane hardwood woodlands. The remaining undeveloped land in the study area is comprised of chaparral/shrubland, riparian, wetland, open water classes.

The habitat and plant community descriptions below are largely based upon information from the California Wildlife Habitat Relationships System. The CWHR habitat classification scheme was developed to support the CWHR System, a wildlife information system and predictive model for California's regularly-occurring birds, mammals, reptiles and amphibians. When first published in 1988, the classification scheme had 53 habitats. These habitats are described in detail in the CWHR publication "A Guide to Wildlife Habitats of California" (Mayer and Laudenslayer 1988).

Although "wetland and riparian" is not included as a type in CWHR, the description for valley foothill riparian is included in that category (below). Furthermore, vernal pools are included in the *Wetland and Riparian* description, but are also recognized as a key element of annual grasslands. The *Unique Plant Communities* section below covers highly adapted plants that occur in geologically diverse and limiting sites: serpentinite, gabbro, and Ione Formation.

Annual Grassland

Annual grassland habitat occurs mostly on flat plains to gently rolling foothills and is dominated by non-native grasses. These include wild oats, soft chess, ripgut brome, red brome, wild barley, and foxtail fescue. Common forbs include broadleaf filaree, redstem filaree, turkey mullein, true clovers, bur clover, popcorn flower, and many others. California poppy, the state flower, is found in this habitat. Perennial grasses, found in moist, lightly grazed, or relic prairie areas, include purple needlegrass and Idaho fescue. Vernal pools (see: "*Wetland and Riparian*" below) are an important habitat element in low-lying grasslands and support a variety of unique and common wildlife; they are found in small depressions with a hardpan soil layer, support downingia, meadowfoam, and other species (Parker and Matyas 1981). Many of these species also occur as understory plants in oak woodland and other habitats. Structure in annual grassland depends largely on weather patterns and livestock grazing. Annual grassland habitats occupy what was once native grassland (Bartolome 1981, Bartolome and Gemmill 1981).

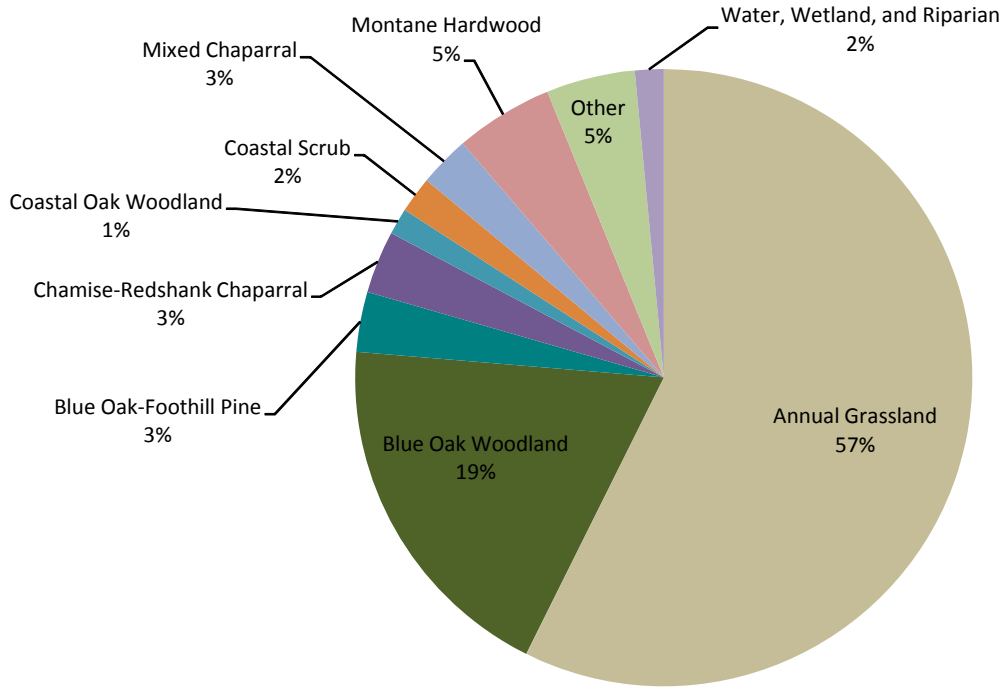

Figure 5. Relative percentage of vegetation types within the potential program areas.

Many wildlife species use annual grasslands for foraging, often in association with features such as cliffs, caves, ponds, or habitats with woody plants for breeding, resting, and escape cover. Reptiles that breed in annual grassland habitats include the western fence lizard, common garter snake, and western rattlesnake (Basey and Sinclear 1980). Mammals typically found in this habitat include the black-tailed hare, California ground squirrel, Botta's pocket gopher, western harvest mouse, California vole, badger, and coyote (White *et al.* 1980). The endangered San Joaquin kit fox also is found in and adjacent to this habitat (U.S. Fish and Wildlife Service 1983). Common birds known to breed in annual grasslands include the burrowing owl, short-eared owl, horned lark, and western meadowlark (Verner and Boss 1980). This habitat also provides important foraging habitat for the California condor, turkey vulture, northern harrier, American kestrel, black-shouldered kite, and prairie falcon.

Blue Oak Woodland

Blue oak woodland occurs along the western foothills of the Sierra Nevada-Cascade Ranges, the Tehachapi Mountains, and in the eastern foothills of the Coast Ranges, forming a nearly continuous ring around the Central Valley. It is generally found at elevations from 500 to 2,000 ft at the northern end of its range on the western slopes of the Sierra Nevada, from 250 to 3,000ft in the Central Coast Range, and from 550 to 4,500 ft in the Transverse and Peninsular Ranges (Sudworth 1908). Blue oak woodland is usually associated with shallow, rocky, infertile, well-drained soils from a variety of parent materials (McDonald 1985). Blue oaks are well adapted to dry, hilly terrain where the water table is usually unavailable (Griffin 1973). Blue oak is the dominant species, comprising 85-100% of the trees present, and may reach >80 ft in height (McDonald 1985). Common associates in the canopy are coast live oak in the Coast Ranges and interior live oak in the Sierra Nevada, along with shrub species (e.g., poison-oak, California coffeeberry) and annuals (e.g., brome grass, wild oats, filaree). Generally these woodlands have an overstory of scattered trees, although the canopy can be nearly closed on some sites (Pillsbury and De Lasaux 1983). The canopy is dominated by broad-leaved trees often forming open savanna-like stands with mostly non-native grasses in the understory. Most stands of blue oak exist as medium or large tree stages with few or no young blue oaks present (White 1966, Holland 1976, Griffin 1977, Baker *et al.* 1981). Few areas can be found in California where successful recruitment of blue oaks has occurred since the turn of the century (Holland 1976), which may be caused by changes in land use; consumption or damage of acorns and seedlings by insects, livestock, and native animals; competition between seedlings and introduced annuals; and the absence of appropriate climatic conditions. Griffin (1977) suggests that live oaks may replace deciduous oaks in some areas because their seedlings are more browse resistant. For the Sierra Nevada, Verner and Boss (1980) report wildlife use including 29 species of amphibians and reptiles, 57 species of birds, and 10 species of mammals find mature stages of this habitat type suitable or optimum for breeding, assuming that other special habitat requirements are met.

Blue Oak Foothill Pine Woodland

The range of blue oak foothill pine woodland generally rings the foothills of the Central Valley, between 500 and 3,000 ft in elevation. Blue oak and foothill pine typically comprise the overstory of this habitat, with blue oak usually most abundant; associates in the Sierra Nevada include interior live oak and California buckeye, whereas in the Coast Ranges associates include coast live oak, valley oak, and California buckeye (Griffin 1977). Other associates are annual grasses and forbs at lower elevations and shrubs in higher elevations. This habitat, diverse in structure both vertically and horizontally, often has a mix of hardwoods, conifers, chaparral, and strips of riparian forest interspersed with patches of annual grassland (Griffin 1977). Usually existing stands are mature with canopies reaching 50 ft, infrequently 100 ft., seldom forming continuous cover over large area. The Blue Oak Woodlands differ from this oak-pine type in lacking a conifer component and usually in lacking a shrub component. Blue Oak-Pine woodlands provide breeding habitats for a large variety of wildlife species, although no species is entirely dependent on them for breeding, feeding, or cover. In the western Sierra Nevada, for example, 29 species of amphibians and reptiles, 79 species of birds, and 22 species of mammals find mature stages of this type suitable or optimum for breeding,

assuming that other special habitat requirements are met (Verner and Boss 1980). Most species of cavity-nesting birds use living oaks, where cavities are often in decayed scars and breaks. Acorns are an important food resource for many species of birds (Verner 1980a.) and mammals (Barrett 1980).

Coastal Oak Woodland Vegetation

Coastal oak woodlands are common in mesic coastal foothills of California. These woodlands do not form a continuous belt, but occur in a mosaic closely associated with mixed chaparral, coastal scrub and annual grassland. The composition of overstory trees and understory of coastal oak woodland varies due to the landscape and climatic diversity over which this habitat occurs. This community is usually dominated by coast live oak, which grows in moister mesic sites and sometimes is the only overstory species. On drier, interior sites, coast live oak mixes with valley oak, blue oak, and foothill pine. Understory plants in moist areas tend to be dense and shade tolerant shrubs with high litter layers in contrast to being grassland in drier areas. Interior live oak usually occurs at higher elevations in the interior mountains, often associated with rock outcrops. Coastal oak overstory consists of deciduous and evergreen hardwoods. In mesic sites, trees form a closed canopy, whereas canopies are open in dry open woodland or savannah. Some species of deciduous oaks have not successfully reproduced for over 60 years (White 1966, Brooks 1971, Griffin 1971 and 1977, Fieblekorn 1972, Snow 1972, Holland 1976). Evergreen oaks have been more successful and as a result appear to be gaining dominance in some areas (Griffin 1977). In other locations, it appears that coast live oak is being replaced by California bay as a result of grazing pressures and lack of successful regeneration (McBride 1974). Most coastal oak woodlands have medium to large trees, and do not have serious regeneration problems. Engelmann oak, however, is not adequately reproducing for reasons similar to those of blue oak. Natural and manmade fires may still be important in some areas. Southern oak woodlands have apparently experienced an increase in frequency of fires in recent years. Studies indicate that Engelmann oak and coast live oak are able to survive most fires (Snow 1979). Barrett (1980) reports that at least 60 species of mammals may use oaks in some way. Verner (1980) reports 110 species of birds observed during the breeding season in California habitats where oaks form a significant part of the canopy or subcanopy. Quail, turkeys, squirrels, and deer may be so dependent on acorns in fall and early winter that a poor acorn year can result in significant declines in their populations (Shields and Duncan 1966, Schitoskey and Woodmansee 1978).

Montane Hardwood

In the Coast Ranges, live oak often forms pure stands on steep canyon slopes and rocky ridge tops, replaced at higher elevations by huckleberry oak (Parker and Matyas 1981) and knobcone pine; digger pine, Oregon white oak, and coast live oak become abundant at lower elevations. Middle elevation montane associates are Douglas fir, tanoak, Pacific madrone, California laurel, California black oak, and bristlecone fir, while understory vegetation is mostly scattered woody shrubs (e.g., manzanita, poison oak) and forbs. In the Sierra Nevada, steep, rocky south slopes of major river canyons often are clothed extensively by canyon live oak and scattered old-growth Douglas fir with associated understory vegetation including Oregon grape, wood rose, manzanita, and poison oak, and some forbs and grasses. Tree heights tend to be uniform at most ages in mature stands where hardwoods occur, but subordinate to conifers. Mature oaks may reach >90 ft in favorable sites. Rapid sprout growth enables hardwoods to capture favorable micro sites, often forcing conifers to invade harsher sites. In most instances, succession is slow, and where fire is frequent, live oak becomes scarce or even drops out of the montane hardwood community. Bird and animal species characteristic of the montane hardwood habitat include disseminators of acorns (scrub and Steller's jays, acorn woodpecker, and western gray squirrel) plus those that use acorns as a major food source such as wild turkey, mountain quail, band-tailed pigeon, California ground squirrel, dusky-footed woodrat, black bear, and mule deer. Many amphibians and reptiles are found on the forest floor in the montane hardwood habitat. Among them are Mount Lyell salamander, ensatina salamander, relictual slender salamander, western fence lizard, and sagebrush lizard. Snakes include rubber boa, western rattlesnake, California mountain kingsnake, and sharp tailed snake.

Chamise Redshank Chaparral
Chamise-redshank chaparral occurs on steep slopes and ridges with shallow soils, typically below 4,000 ft (Thorne 1976, Cheatham and Haller 1975). It may consist of nearly pure stands of chamise or redshank, a mixture of both, or with other shrubs, and generally has >60% relative chamise-redshank cover. The purest stands of chamise occur on xeric, south-facing slopes (Hanes 1976) and tend to be 3 -6 ft. in height, infrequently 9 ft. for chamise and 4-12 ft. for redshank, sometimes up to 18 ft. Ceanothus and sugar sumac are common associates of redshank (Hanes 1965 and 1977, Horton 1960, Cheatham and Haller 1975). Mature chamise-redshank chaparral is single layered, generally lacking well-developed herbaceous ground cover and overstory trees. Mature redshank frequently is more open than chamise and can have sparse herbaceous cover between shrubs (Hanes 1965 and 1977; Paysen *et al*. 1980). Fire occurs regularly in chamise-redshank chaparral and influences succession to mature shrubs (Hanes 1971); old unburned stands generally have poor species diversity and vigor (Hanes 1971; Rundel and Parsons 1979; Vogl 1977), reflected by declines in deer (Biswell *et al*. 1952), small mammals (Quinn 1979), birds (Wirtz 1979), and reptiles (Simovich 1979). Wildlife species found in this habitat often reach peak densities in the first two or three decades, frequently 1- 15 years after a fire (Rundel 1982).

Coastal Scrub Vegetation
Coastal scrub is typical of areas with steep, south-facing slopes; sandy, mudstone or shale soils; and average annual rainfall of less than 12 in. However, it also regularly occurs on stabilized dunes, flat terraces, and moderate slopes of all aspects where average annual rainfall is up to 24 in. No single species is typical of all coastal scrub stands. With the change from temperate to drier sites, dominance shifts from evergreen species in the north to drought-deciduous species in the south. Southern sage scrub, for example, differs in type due to available moisture. A fairly common species in all types is California sagebrush. The most mesic area, from Mt. Diablo south to Santa Barbara, is dominated by black sage and California buckwheat (Kirkpatrick and Hutchinson 1980; Mooney 1977; Westman 1981b; Gray 1982). Structure is typically low to moderate-sized shrubs with flexible branches, semi-woody stems growing from a woody base, and a shallow root system (Harrison *et al*. 1971, Bakker 1972). The southern sage scrub form, typical of inland central (Mt. Diablo) and most southern stands, is made up of a shrub layer up to 7 ft, and canopy cover often approaches 100% (Mooney 1977). Sufficient light penetrates through the canopy to support an herbaceous understory. Major human-caused disturbances often permit xeric tolerant coastal scrub to invade new areas (Harrison *et al*. 1971; Malanson and O'Leary 1982). Southern coastal scrub is fire-adapted and most species sprout readily from crowns after burning (Westman 1982). At its lowest elevations, coastal scrub is associated with coastal prairie/perennial grassland, cropland and pasture, and at mid-high elevation annual grassland, Douglas fir, coastal oak woodland, montane hardwood, closed-cone pine cypress, chamise-redshank chaparral and mixed chaparral. Coastal scrub appears to support numbers of vertebrate species roughly equivalent to those in surrounding habitats (Stebbins 1978). A subspecies of the black-tailed gnatcatcher, a California Department of Fish and WildlifeWildlife Species of Special Concern (Remsen 1978), is found exclusively in southern sage scrub.

Mixed Chaparral Vegetation
Mixed chaparral generally occurs on steep slopes and ridges with relatively thin, well-drained soils (Ornduff 1974, Cheatham and Haller 1975). Compared to chamise-redshank chaparral, mixed chaparral generally occupies more mesic sites at higher elevations or on north-facing slopes. At upper elevations, mixed chaparral grades into coastal oak woodland, ponderosa pine or mixed conifer types and frequently forms the understory of these habitats. Mixed chaparral is a floristically rich type that supports roughly 240 species of woody plants (Ornduff 1974), with composition changing north to south along with precipitation regime, aspect, and soil type. Dominant species include scrub oak, chaparral oak, and several species of Ceanothus and manzanita. There are many associated shrubs such as chamise, birchleaf mountain mahogany, California buckeye, and poison oak, and dwarf Ceanothus and serpentine manzanita are local serpentine endemics (Cheatham and Haller 1975, Thorne 1976, Hanes 1977), along with incense-cedar, knobcone pine, Coulter pine, and digger pine

(Thorne 1976). Mixed chaparral is a structurally homogeneous brushland where height and crown cover vary considerably locally (Hanes 1977). At maturity, mixed chaparral typically is dense, with >80% absolute shrub cover, often being 3-15 ft, sometimes nearly 20 ft (Horton 1960, Cheatham and Haller 1975, Hanes 1977). Post-fire recovery of mixed chaparral shifts from early subshrubs, annuals, and perennials to mature shrubs (Sweeney 1956). Shrub species composition also may change as the stand ages. No wildlife species are known to be restricted to mixed chaparral. Most species are found in other shrub-dominated types (e.g., to chamise-redshank, sagebrush).

Wetland and Riparian

Wetlands

Historically, native vegetation in the Central Valley was predominantly grasslands dominated by bunchgrasses and annual forbs, with extensive riparian forests and freshwater marshes. Freshwater marshes, fed by winter precipitation and snowmelt runoff, formerly covered over 4 million acres of the Valley floor. The largest freshwater wetland area in California was associated with Tulare, Buena Vista, and Kern lakes. These lakes contained as much as 2,000 mi of freshwater marsh habitats along their shorelines, although the amount would vary naturally. The Central Valley currently has nearly 1,320,000 acres of wetlands, of which 80% is freshwater palustrine (e.g., ponds, vernal pools, playas, wet meadows, slope wetlands). Estimates of total historical wetland loss vary for California. Some regional studies have reported loss rates up to 90%. Some wetland types, such as vernal pools, riparian habitat, and coastal wetlands have experienced disproportionately higher rates of loss. Wetland loss has occurred as land was converted from natural habitat to urban and agricultural land uses (Duffy and Kahara 2009; www.californiawetlands.net/tracker/cv).

Of the nearly 1.3 million acres of wetlands in California today, about 9% is found in the riverine class, while 11% is associated with lakes and reservoirs. Riverine wetlands get most of their water from the flow conveyed by a natural or artificial channel, such as a river (e.g., Sacramento and San Joaquin rivers), stream, canal, or ditch. They can form within any portion of a river system, including low terraces, floodplains, banks, and river beds. Lakes, including reservoirs, are surface water storage areas at least 20 acres large and at least 6 feet deep on average during the dry season. Lake wetlands form along lakeshores and get most of their water from their adjacent lakes. These wetlands are associated with natural topographic basins or artificial impoundments that are too small or shallow to be lakes or reservoirs, and lack the indicative flora of vernal pools. Most depressional wetlands in California are seasonal. They often depend on multiple water sources, including local runoff, groundwater, and direct precipitation. Seasonal creeks in the Rangeland Ring and potential program areas generally flow during the winter and dry up in the summer. These creeks flow through, and adjacent to many types of terrain, from bedrock, grasslands, vernal pools, and occasional marshlands. Man-made wetlands can form from irrigation canals, seasonal stock ponds, and along the shores of perennial reservoirs. Common plants associated with these features include cattail, bulrush, sedges, and forbs. Seeps and springs form where groundwater emerges as surface runoff without a defined channel. Slope wetlands form where the groundwater rises into the root zone but does not emerge as surface runoff.

Vernal Pools

Vernal pools are a relatively unique ecological resource within the Rangeland Ring (Appendix C). The Merced Grasslands, which falls within the proposed program area in Merced County, is considered one of the largest and most intact vernal pool-grasslands areas in the world. Vernal pools typically form within shallow depressions in grasslands that are underlain by a nearly impervious soil layer. The pools fill with water during winter rains and then slowly dry out through evaporation in the spring. Several types are recognized including valley pools in basin areas which are typically alkaline or saline, terrace pools on ancient flood terraces of higher ground, and pools on volcanic soils. The soil and hydrologic conditions in vernal pools render it difficult for exotic plant species to invade,

FWS

Vernal pool in spring

with the result that they are one of the few low-elevation habitats still dominated by native species (Garone 2011; AECOM 2009).

Vernal pools support numerous native plant and animal species that are specially adapted to this unique, ephemeral environment—many of these species are found only in California (Keeler-Wolf *et al*. 1998). These pools and their adjacent uplands provide habitat for plants, aquatic invertebrates, amphibians, reptiles, birds, and mammals, including approximately 20 species of plants and animals that are federally-listed as endangered or threatened and 13 other species of concern (U.S. Fish and Wildlife Service 2005).

Many of the listed species found within the Rangeland Ring and potential program areas are found in vernal pools. In addition, several species of plants and animals that are found only in vernal pools have been designated with special conservation status as rare, threatened, or endangered by Federal and State resource agencies. With regard to plants, the following vernal pool-associated federally listed plant species occupy vernal pools within the Program Area, though some are only found in larger pools; fleshy owl's-clover, Colusa grass, San Joaquin Orcutt grass, hairy Orcutt grass, Hartweg's golden sunburst, and Greene's tuctoria. Because vernal pools, as well as these species, are protected by State and Federal laws, pools are subject to regulations. The historical extent of Central Valley grassland with vernal pools has been greatly reduced by the conversion of rangeland to intensive agriculture and urban and residential development (AECOM 2009).

Since 1976, about 137,000 acres of vernal pool habitat within the Central Valley have been lost to development. This loss has not been distributed evenly across the Central Valley. For example, Mariposa County has not lost any vernal pool habitat since 1976, but at the opposite extreme, Merced County has lost 24,000 acres and Placer County has lost 17,000 acres of the vernal pool habitat found during initial mapping (1987 and 1994, respectively). Three other counties also have lost more than 10,000 acres since the original mapping: Madera (14,300 acres), Stanislaus (14,100 acres), and Tehama (11,000 acres). In addition, counties with smaller acreage losses, but substantial percentage losses, include Yolo (75%), Colusa (63%), Sutter (52%) and Glenn (39%) (AECOM 2009).

Valley Foothill Riparian Vegetation.
Valley-foothill riparian vegetation is found in valleys bordered by sloping alluvial fans, slightly dissected terraces, lower foothills, and coastal plains. It is generally associated with low velocity flows, flood plains, and gentle topography. Dominant species in valley foothill riparian canopy layer

are cottonwood, California sycamore, and valley oak. Typical understory shrub layer is dense and may include wild grape, wild rose, California blackberry, blue elderberry, poison oak, buttonbush, and willows. Canopy height is >90 ft in a mature riparian forest, with a canopy cover of 20-80%, and most trees are winter deciduous. Lianas (usually wild grape) frequently provide 30-50% of the ground cover and festoon trees. Generally, the understory is impenetrable. Cottonwoods grow rapidly and can reach medium-large size in 20-25 years (Sudworth 1908), whereas valley oak dominated riparian systems would probably take >75 years to mature. Transition to adjacent non-riparian vegetation is usually abrupt, especially near agriculture (Cheatham and Haller 1975). Valley foothill riparian habitat is found in association with riverine, grassland, oak woodland, and agriculture, and may intergrade upstream with montane riparian habitats. Valley foothill riparian habitats provide food, water, migration and dispersal corridors, and escape, nesting, and thermal cover for at least 50 species of amphibians and reptiles (Brode and Bury 1985). In one study conducted on the Sacramento River, 147 bird species were recorded as nesters or winter migrants (Laymon 1984). Additionally, 55 species of mammals are known to use California's Central Valley riparian communities (Trapp *et al*. 1985).

Unique Plant Communities

The foothills include a number of soils with physical or chemical properties, or both, that strongly affect and support distinctive vegetation and endemic plants that are rarely found growing on other substrates and are botanically significant. Four types of such substrates are important in the foothills: vernal pool complexes (discussed above), serpentinite, gabbro, and the Ione Formation (Hunter *et al*. 2011). Each is described further below. Appendix C includes a map showing the distribution of these communities.

Serpentine Plant Communities

Serpentine vegetation grows on nutrient poor serpentine rock-based soils. Select plants have become adapted to serpentines everywhere these rocks reach the surface on our planet. The nature of the adaptation to serpentine ranges from strict serpentine endemics, narrowly confined to serpentine—California scrub oak, milkwort, jewelflower, and Kaweah River phacelia—to indicator species that occur on serpentines beyond their normal ranges like Jeffrey pine (Kruckenberg 1993).

California has the largest exposure of serpentine rock in North America. Serpentinite is rich in magnesium and iron, containing large amounts of the mineral serpentine, a hydrated form of magnesium silicate (aka talc). Outcrops of serpentinite are associated with California's fault lines, and occur in the Foothills Area from the North Central to Southern areas. Soils derived from serpentinite have relatively little available calcium, which is an essential nutrient for plants, low concentrations of other nutrients, and high concentrations of heavy metals (Kruckeberg 2002). These soils also tend to be shallow and rocky.

The vegetation growing on these soils tends to be shorter and more open than similar vegetation on other soils, and dominated by different species. A number of endemic plants are associated with serpentine soils in the foothills, many of which are also special status species. This association varies from taxa that are effectively restricted to serpentine soils to taxa that are often, or just sometimes, found on serpentine soils (Safford *et al*. 2005). Although serpentine landscapes account for only about 2% of the Foothills Area, 23% of foothill endemics and 13% of non-endemic special status taxa are associated with these serpentine landscapes (Hunter *et al*. 2011).

Gabbro Plant Communities

Like serpentinite, gabbro rocks are rich in magnesium and iron, and occur sporadically but widely in the foothills including the Program Area (Mariposa County). Soils derived from gabbro share some commonalities with serpentine soils, but provide less extreme conditions for plant growth. Gabbro-derived soils often support diverse, locally distinct vegetation and endemic plant species. As an example, in the Pine Hill area (El Dorado County) north of the potential program area, vegetation

includes grassland, chaparral, and woodland. The chaparral includes tall dense patches dominated by whiteleaf manzanita, buckbrush, and chamise, which are obligate or facultative "seeders," and patches on mesic sites with abundant resprouting shrubs and small trees, including interior live oak, toyon, poison oak, and redbud (Wilson *et al.* 2009). Woodlands are dominated by interior and black oaks with abundant poison oak in their understory. Seven plant species are endemic to the chaparral and woodland communities of the Pine Hill Area (Hunter *et al.* 2011).

Ione Formation Plant Communities
Foothill chaparral is the predominant vegetation covering the Ione Formation. The soils of the Ione Formation are ancient (Singer 1978). They first formed below an inland sea as varied deposits, including sands and gravels, more than 40 million years ago. After the sea receded, they weathered under a tropical climate into a nutrient-depleted, acidic state before being buried and subsequently exhumed near the base of the foothills. Although there are outcrops of the Ione Formation from Butte to Merced counties, the endemic species associated with this substrate occur primarily in Amador County just north of the program area (Holzman and Meyer 2004). There, three endemic species grow in a landscape occupying much less than 1% of the Rangeland Ring. One of these endemic plants, the Ione manzanita dominates a short chaparral with a discontinuous cover of shrubs.

Invasive Plants
Invasive species are those that are not native to the ecosystem under consideration and that cause or are likely to cause economic or environmental harm or harm to human, animal, or plant health (National Invasive Species Council 2006). Invasive plants can have a number of impacts on rangelands, including degrading wildlife habitat and forage, depleting soil and water resources, and reducing plant and animal diversity (DiTomaso 2000). They also can alter physical ecosystem processes, such as fire regimes and nutrient cycling (Brossard and Randall 2007). Invasive plants also impact livestock producers by reducing yield and quality of forage, interfering with grazing, poisoning animals, increasing costs of managing and producing livestock, and potentially reducing land values. A list of the invasive plants causing the greatest effects in the Rangeland Ring was compiled from the invasive species with negative ecological impacts rated "High" in the California Invasive Plant Inventory (Cal-IPC 2006). These species are listed in Table 3.1. The three habitat types having the greatest presence and disturbance by invasive plants include foothill grasslands, foothill riparian, and blue oak savanna and woodland (Cal-IPC 2006).

3.2.2 Fish & Wildlife
The Service is legislatively authorized and entrusted to protect and manage a number of natural resources, including migratory birds, interjursdictional fish, and threatened and endangered species. These "trust resources" are the Service's management priorities. The Service is also entrusted to assist in the conservation of state fish and wildlife through the National Wildlife Refuge System Improvement Act and other legislation.

The Rangeland Ring encompasses a large, diverse area, and there are a great number of species that occur there. Current estimates based on the California Wildlife Habitat Relationships Database (CDFG 2008) are shown in Table 3.2.

As shown in Table 3.2. below, of all species predicted to occur in the Rangeland Ring (536), 460 are known to occur in the proposed program area, representing 86%. Appendix D provides a list of all birds, mammals, reptiles, amphibians, and fish are thought to occur in the Rangeland Ring. General use of foothills habitats by wildlife is discussed below. Readers are encouraged to refer to the vegetation section above which contains general aspects of wildlife use for each type of vegetation and habitat described.

Table 3.1 - Invasive Plants within the Rangeland Ring with a CalIPC Impact Rating of "High"

Plant Name	*Habitat Type Impacted*
Barb goatgrass	blue oak woodland, annual grassland, blue oak foothill pine woodland
Giant reed	valley foothill riparian, wetlands
English ivy, Algerian ivy	woodlands
Red brome	annual grassland, woodlands, coastal scrub
Cheatgrass	blue oak woodland, annual grassland, blue oak foothill pine woodland
Yellow starthistle	blue oak woodland, annual grassland, valley foothill riparian
Fennel	annual grassland, coastal scrub, valley foothill riparian, wetlands
Perennial pepperweed, Tall whitetop	annual grassland, valley foothill riparian, wetland
Eurasian watermilfoil	wetlands
Purple loosestrife	wetlands
Scotch broom	annual grassland
French broom	annual grassland
Himalayan blackberry	blue oak woodland, blue oak foothill pine woodland ,valley foothill riparian, wetlands
Medusahead	blue oak woodland, blue oak foothill pine woodland, chaparral, annual grassland
Saltcedar/Tamarisk/small flower tamarisk	valley foothill riparian
Gorse	blue oak savanna and woodland, foothill grassland, foothill hardwood-conifer woodland, foothill riparian

Table 3.2 - Fish and Wildlife Species Richness of the Rangeland Ring and Potential Program Area

Faunal Class	*Rangeland Ring*	*Program Area*	*Percent of Rangeland Ring Species Thought to Occur in Program Areas*
Fish	46	34	76
Amphibians	35	22	63
Reptiles	46	37	79
Birds	293	264	90
Mammals	116	103	89
Total	536	460	86

Migratory Birds

California's rangeland habitats are extremely important to migratory birds. Current estimates indicate the Rangeland Ring is used by 293 species, of which 264 (90%) occur in the potential program area (Appendix D: Species List). Major groups of migratory birds and the number of species within the foothills include:

- grebes (5)
- waterbirds (26)
- waterfowl (33)
- raptors (31)
- shorebirds (29)
- gallinaceous birds (6)
- neotropical landbirds (163)

The value of the Rangeland Ring is evidenced by the 34 Important Bird Areas (IBAs) in the Rangeland Ring (Audubon California 2008). The proposed CFLA program area contains all or major portions of eight IBAs, including three which have a global designation: the La Grange - Waterford Grasslands (Central Sierra Foothills), South Fork Kern River (Southern Sierra Foothills) and Panoche Valley (Diablo Range).

Several bird species inhabiting the Rangeland Ring are California Bird Species of Special Concern (BSSC) due to criteria on population trends and range fluctuations. Criteria scores indicate the relative priority concern: Priority 1, Priority 2, and Priority 3, as shown in Table 3.3.

California Partners in Flight, Point Reyes Bird Observatory, and partners have promoted development of California's Riparian Bird Conservation Plan (RHJV 2004), Oak Woodland Bird Conservation Plan (CPIF 2002), and Draft Grassland Bird Conservation Plan (CPIF 2000). Each of these plans identifies priority species that are reliant on these major habitat types (Table 3.4).

Over 130 species of birds are thought to occur within Rangeland Ring grassland and savanna habitats. Rangeland habitats are particularly important to wintering raptors such as prairie falcon and ferruginous and rough-legged hawks (Pandolfino 2011). Over the last decade of Christmas Bird Counts, nearly 30% of prairie falcon observations and over 40% of ferruginous hawk observations were within California. In winter, large numbers of long-billed curlews, vesper and savanna sparrows, and horned larks are found in these habitats as well. Grassland and savanna habitats also provide breeding habitat for a number of raptors, including northern harrier, Swainson's hawk, peregrine falcon, prairie falcon, burrowing owl, and short-eared owl. The endangered California condor, one of the world's rarest birds, breeds within the study area on rocky outcrops in savanna and scrub habitats, and nearly 70 species of passerines are predicted to occur in grasslands and savannas across the study area. Common birds known to breed in annual grasslands include the burrowing owl, short eared owl, horned lark, and western meadowlark (Verner *et al*. 1980). This habitat also provides important foraging habitat for the California condor, turkey vulture and the American kestrel. Small

Table 3.3 - California Bird Species of Special Concern (BSSC) within the Rangeland Ring

Priority Species: Riparian Bird Conservation Plan		
Swainson's Hawk	Spotted Sandpiper	Western Yellow-billed Cuckoo
Willow Flycatcher	Warbling Vireo	Least Bell's Vireo
Bank Swallow	Tree Swallow	Swainson's Thrush
Yellow Warbler	Common Yellowthroat	Wilson's Warbler
Yellow-breasted Chat	Song Sparrow	Black-headed Grosbeak
Blue Grosbeak	Tri-colored Blackbird	
Priority Species: Oak Woodland Bird Conservation Plan		
Lark Sparrow	Oak Titmouse	Acorn Woodpecker
Western Bluebird	Blue Gray Gnatcatcher	Ash-throated Flycatcher
Hutton's Vireo	Nuttall's Woodpecker	Yellow-billed Magpie
Western Scrub Jay	White-breasted Nuthatch	Lewis's Woodpecker
Priority Species: Draft Grassland Bird Conservation Plan		
Ferruginous Hawk	Grasshopper Sparrow	Mountain Plover
Northern Harrier	Western Meadowlark	Savannah Sparrow
White-tailed Kite		

Table 3.4 - Priority Species: Partners in Flight Bird Conservation Plans

Priority 1	*Priority 2*	*Priority 3*
American White Pelican	California Spotted Owl	American Bittern
Purple Martin	Grasshopper Sparrow	Belted Kingfisher
	Large-billed Savannah Sparrow	Black Tern
	LeConte's Thrasher (San Joaquin population)	Bufflehead
	Lesser Sandhill Crane	Burrowing Owl
	Long-eared Owl	Least Bittern
	Northern Harrier	Redhead
	Short-eared Owl	Snowy Plover
	Tricolored Blackbird	Sora
	Yellow-headed Blackbird	Swainson's Thrush
		Vermillion Flycatcher
		Yellow-breasted Chat

areas of emergent wetlands embedded within the grassland and savannah landscape are used by American white pelican, white-faced ibis, red-head duck, bald eagle, northern harrier, white-tailed kite, American peregrine falcon, black rail, bank swallow, Modesto song sparrow, and tricolored blackbird. Wetland-dependent birds that nest in this habitat include Canada goose, mallard, cinnamon teal, gadwall, Virginia rail, sora, American coot, common moorhen, and killdeer (Hunter *et al* 2011).

Oak woodlands may rank among the top three habitat types in North America for breeding bird richness (Verner 1983). California oak woodlands are especially rich in bird species. Approximately 110 species of birds can be observed during the breeding season (Verner 1980). Species composition depends on the presence of a variety of habitat elements such as riparian zones, snags, trees cavities, and large woody debris as well as the degree of canopy cover. More open habitats tend to support more grassland bird species (Standiford and Tinnin 1996). Studies in the central Sierra Nevada foothills showed that blue oak woodland habitat alone is used by 92 species of birds, 60 of which nest there (Block and Morrison 1990). Some birds of California's oak woodlands are connected to this habitat mainly through acorns, which are eaten and stored by dozens of species. This relationship is reciprocal: species like western scrub-jays, Steller's jays, and yellow-billed magpies do not completely retrieve stored acorns and thus act as dispersers of oak seedlings across the landscape. Large oak trees also provide habitat for cavity-dependent nesting birds and other wildlife, as well as caching sites for acorn woodpeckers, nuthatches, and other species. Additionally, oaks commonly host mistletoe, which is an important food for western bluebirds and phainopepla (Zack 2002). Three species of oak woodland birds are endemic to California and Baja California, Mexico – Nuttall's woodpecker, yellow-billed magpie, and oak titmouse.

Mike Baird

Nuttall's woodpecker

A variety of flycatchers, vireos, warblers, and many other species occur in montane hardwood and conifer forests. Canopy-dwelling species include olive-sided flycatcher, and western tanager. Large snags and decaying living trees offer substrates for nesting cavities for western screech owl, pileated woodpecker, and northern flicker. Sap trees are used by a variety of woodpeckers, and high-protein pine seeds are eaten by white-headed woodpecker, mourning dove, white-breasted nuthatch, red-breasted nuthatch, chestnut-backed chickadee, mountain chickadee, dark-eyed junco, spotted towhee, black-headed grosbeak, and evening grosbeak. Newly emerging oak leaves in foothill hardwood and conifer woodland support an abundance of insects that provide abundant springtime food for migrating and nesting flycatchers, vireos, warblers, and other insectivorous birds (Hunter *et al.* 2011). Despite their relatively small size and ephemeral nature, vernal pool landscapes provide vital links in the Central Valley portion of the Pacific Flyway.

The larger vernal pools, known as playa pools, provide important foraging and courtship areas for numerous species of migrating ducks, as well as locally breeding mallards, gadwalls, and cinnamon teal. The abundant invertebrate fauna in the pools provide an important source of protein and calcium necessary for the ducks' migration and reproduction. The pools also support many additional species of wetland birds, including tundra swans, great egrets, great blue herons, black-necked stilts, and American avocets. The protein-rich grasses of the adjacent uplands provide an optimal food source for Ross's, white-fronted, Canada, and cackling geese, as well as American wigeon, a grazing duck species (Garone 2011).

Man-made wetlands within rangelands can provide important habitat for both common and special status species birds, such as the California black rail, a state-listed threatened species, and federal species of management concern. Although the majority of California black rails use the salt marshes of San Francisco Bay area, they have been found in the northern Sierra foothills, associated with palustrine emergent persistent wetlands that have irrigation canal water as the primary source (Richmond *et al.* 2010).

Riparian habitats have been identified as the most important habitats to landbird species in California (Manley and Davidson 1993, Davidson 1995), providing breeding, wintering, and migratory habitat as well as corridors for dispersal. No other habitat in California compares in either bird density or species richness (Laymon 1984). Typical breeding birds in riparian habitats include downy woodpecker, black phoebe, warbling vireo, western scrub-jay, bushtit, Bewick's wren, house wren, American robin, orange-crowned warbler, yellow-breasted chat, black-headed grosbeak, lazuli bunting, spotted towhee, song sparrow, house finch, and lesser goldfinch. Riparian areas are also attractive to migratory songbird species including a diversity of flycatchers, vireos, warblers, tanagers, and grosbeaks (Hunter *et al.* 2011).

A variety of bird species either nest in foothill chaparral ecosystems or use them seasonally. Common breeding species include Anna's hummingbird, western scrub-jay, blue-gray gnatcatcher, wrentit, spotted towhee, California towhee, and lazuli bunting. Birds can be particularly abumerous in foothill chaparral in winter, perhaps because this community lies below the snow zone and because many shrubs, such as toyon, produce fruits that attract species such as American robin, cedar waxwing, Townsend's solitaire, hermit thrush, and varied thrush. Ruby-crowned kinglet and Hutton's vireo are typical wintering and resident birds that primarily forage for insects in evergreen foliage (Hunter *et al.* 2011).

Mammals

Estimates indicate that at least 118 species of mammals use the Rangeland Ring and that 105 (89%) of these are likely to be found in the proposed program area. Seven species are endemic and near endemic species–the giant kangaroo rat, Heermann kangaroo rat, Santa Cruz kangaroo rat, Tipton kangaroo rat, Fresno kangaroo rat, Sonoma chipmunk, and the Suisun shrew. The Rangeland Ring

hosts a diversity of groups: rodents (62), bats (18), weasel family (10), shrews (6), rabbits (5), canids (4) and an assortment of others including black bear, mountain lion, elk, proghorn, ringtail, and mountain beaver. Mammals commonly found in foothill habitat include the black-tailed hare, California ground squirrel, Botta's pocket gopher, western harvest mouse, California vole, badger, coyote, gray fox, desert cottontail, and mule deer (White *et al.* 1980). The endangered San Joaquin kit fox is found in and adjacent to this habitat (U.S. Fish and Wildlife Service 1983). The rich rodent and lagomorph populations are important food sources for predators, which includes bobcat and coyote. Montane hardwood is valuable to migratory deer herds that find critical feeding and wintering habitat there, and other larger mammals that frequent this habitat include coyote, ringtail, raccoon, black bear, mountain lion, and bobcat. A variety of smaller rodents, squirrels, and shrews favor the mix of shrub thickets and open patches (Mayer and Laudenslayer 1988). Foothill fresh emergent wetlands are limited but are used by numerous bat species including long-eared myotis, long-legged myotis, and Yuma myotis (Hunter *et al.* 2011).

Reptiles and Amphibians

The Rangeland Ring hosts 81 species of reptiles and amphibians, representing a wide diversity of species (Appendix D: Species List). The number of species in recognized groups include: snakes (27), lizards (13), skink (2), gecko (1), turtles (3), salamanders (20), frogs and toads (13), and newts (2). At least 46 species of reptiles inhabit the Rangeland Ring and 37 of those (80%) use the proposed program area. Additionally, 35 species of amphibians use the Rangeland Ring of which 22 (67%) reside in the proposed program area. Characteristic reptiles that breed in annual grassland habitats include the western fence lizard, common garter snake, gopher snake, yellow bellied racer, and western rattlesnake (Basey and Sinclear 1980), and the Pacific rattlesnake in oak woodlands. The California red-legged frog has been Federally-listed as threatened since June 1996, and is the largest native frog in the western United States. This species remains fairly widely distributed but once ranged across much of California, including portions of the Sierra Nevada Mountain Range. Pacific tree frogs and western toads may be common in vernal pool complexes, and blue oak savanna woodland supports the California tiger salamander. Many amphibians and reptiles depend on riverine ecosystems; these include California newt, western toad, foothill yellow-legged frog, western terrestrial garter snake, western aquatic garter snake, and western pond turtle. Fresh emergent wetlands are limited but are used by California tiger salamander, western pond turtle, and the federally-listed threatened giant garter snake. Bullfrogs are abundant, nonnative amphibians that are common in shallow ponds and other permanent wetlands (Hunter *et al.* 2011). Stock ponds can also supply valuable habitat in areas without wetlands. The threatened California tiger salamander often uses stock ponds to breed, though ponds with non-native fishes or bullfrogs appear to be unsuitable for tiger salamanders (Bolster 2010).

Miguel Vieira

Pacific tree frog

Fish

The Rangeland Ring hosts about 58 fish species with nearly 70 percent these predicted to occur in the potential program area. The largest groups of species in descending order include minnows (13 species), sunfish (12), salmon/trout (8), lamprey (4), and catfish (4). Groups with two species each include herring, suckers, temperate bass, surfperch, and sculpin; and groups represented by only one species include sturgeon, smelt, silversides, livebearers, stickleback, true perch, and goby. Of these

species, nearly 70% are predicted to occur in the potential program area. Some of these species are native to California's Central Valley, while 23 are native to North America but have been transplanted to California where they thrive (e.g., Striped bass, Channel catfish). Exotic species include the brown trout, common carp, goldfish, and yellowfin goby.

At least 15 major rivers and numerous tributaries flow through the foothills area. Rivers are used as migration routes for fish and wildlife, and are important to maintain as migration corridors, particularly under the threat of climate change.

Streams draining into the Central Valley contains four different groups of fish species that are adapted to a definable habitat structure largely predicted by elevation/gradient, and associated environmental conditions such as flow and temperature. Moving from high elevation streams down to the valley floor, these include the rainbow trout group, California roach group, pikeminnow-hardhead -sucker group, and deep-bodied fishes group. The groups most common to the foothill ring include the California roach and pikeminnow-hardhead-sucker groups, although the higher elevation rainbow trout group occurs artificially at the lower elevations in colder tailwaters flowing from dams (Moyle 2002).

The California roach group is generally found in small, warm tributaries to larger streams in the foothills that flow through oak and foothill pine woodlands. In the foothills bordering the San Joaquin Valley, these seasonally intermittent streams are located in a relatively narrow elevational band that overlaps with the upper portion of the pikeminnow-hardhead-sucker group. During winter and spring the streams are swift and subject to flooding. The primary permanent native resident is the California roach which survives here because of their small size and ability to tolerate low oxygen levels and high temperatures in the summer. During the higher flows of winter and spring Sacramento suckers, pikeminnows, and other native minnows may spawn in these streams. Their young may survive the summer in these reaches if pools are large and deep enough (Moyle 2002).

In the streams that drain into the San Joaquin Valley, the pikeminnow-hardhead-sucker group can be separated from groups above (rainbow trout) and below it (deep-bodied fish), mainly because most streams where it is found become warm or intermittent (or both) during summer. Generally, streams inhabited by the fish of this zone have average summer flows of >10 cfs; deep rocky pools; and wide, shallow riffles (Moyle and Nichols 1973, Brown and Moyle 1993). Water quality in these reaches is normally high (high clarity, low conductivity, high dissolved oxygen, summer temperatures 66-72°F) and includes complex habitat created by stream meanders and riparian vegetation (Brown 2000, Marchetti and Moyle 2000). The pikeminnow-hardhead-sucker group occupies a relatively narrow elevation range, from 90 to 1,480 ft above sea level in Sierra Nevada foothill streams and a much wider range in Sacramento Valley foothill streams (Moyle 2002).

Sacramento pikeminnows and Sacramento suckers are typically the most numerous fish of this group. HardheadHardheads are normally limited to cooler waters in areas with deep pools and rock-bottoms. Other fish that may live here are tule perch, speckled dace, California roach, riffle sculpin, rainbow trout, smallmouth bass, and green sunfish. The latter two introduced species generally become abundant only if dams stabilize the flow regime. Rainbow trout are found in the larger and colder streams within the pikeminnow-hardhead-sucker zone. Many anadromous fish (mainly Chinook salmon, steelhead, and Pacific lamprey) have (or had) major spawning grounds in this zone, and their young are often part of the group. Larval Pacific lampreys spend 5-7 years in muddy backwaters, migrating downstream only when they metamorphose into the predaceous adult stage. Juvenile fall-run Chinook, however, usually move downstream within a few months after hatching to avoid high summer temperatures, but young spring-run Chinook and steelhead may spend a year or more in the cooler upper reaches of this zone (Moyle 2002).

Invertebrates

Numerous groups and species of invertebrates inhabit the foothills landscape, including insects, arachnids, mollusks, and crustaceans. In terms of Special Status Species alone for the Sierra-

Cascade foothills (California Natural Diversity Data Base 2010), there are a number of protected invertebrates: mollusks (12), crustaceans (6), arachnids (15), and insects (17). Examples of invertebrates of concern include the Diablo Range pyrg springsnail, monarch butterfly, Morrison blister beetle, San Emigdio blue butterfly, Stanislaus harvestman, and San Joaquin dune beetle. Blue oak savanna woodland and riparian areas supports valley elderberry longhorn beetle; and army ants, primitive bristletails, and land snails are among the ecoregion's large number of relict and unusual invertebrate species (Hunter *et al*. 2011).

Vernal pools provide habitat for animals that can tolerate the extreme range of conditions that characterize these ecosystems. Many are specialized animals that are able to complete their life cycles in the short period during which pools are wet. Specialized vernal pool invertebrates include fairy shrimp, clam shrimp, tadpole shrimp, vernal pool andrenid, seed shrimp, and daphnia. Other common invertebrates found in vernal pools include water beetles, water boatmen, and aquatic larvae of fly and dragonfly species. Vernal pool invertebrate communities have evolved in the absence of aquatic predators such as fish and nonnative bullfrogs, which cannot survive in vernal pools because of the long period of desiccation. The unique invertebrate communities in vernal pools include three special status crustacean species—vernal pool fairy shrimp, vernal pool tadpole shrimp, and California 'linderiella' fairy shrimp— which have evolved accelerated reproductive maturity and high reproductive rates in response to the extreme environmental conditions (Hunter *et al*. 2011).

Pollinators

The health of the California foothills and Central Valley habitats is greatly affected by pollinators, which are critical to the functioning of the area's diverse vegetation types. Pollinators (insects, birds, bats) are necessary for the reproduction of nearly 70% of the world's flowering plants, including more than two-thirds of the world's crop species. The U.S. alone grows more than 100 crops that either need or benefit from pollinators, and the economic value of these native pollinators is estimated at $3 billion per year in the U.S. Fruits and seeds derived from insect pollination are a major part of the diet of ~25% of all birds and of mammals.

Despite the dependence of crop production on native pollinators , many agricultural areas lack the habitat necessary to support them. In the late 1990's, bee biologists started to notice a decline in the abundance and distribution of several wild bumble bee species, such as the Western bumble bee. In the Central Valley, wild bumble bees were once very common. Franklin's bumble bee was historically found only in a small area in southern Oregon and northern California, and it may now be extinct. The California Agricultural Pollinator Project is a first of its kind effort to bring native bees back to large scale agriculture (www.xerces.org/california-agricultural-pollinator-project/).

Proximity to natural or semi-natural land is often an important predictor of pollinator diversity in cropland. For agricultural areas that have lost native pollinators due to habitat modification or pesticide treatments, adjacent natural areas provide two valuable benefits. First, they are a source of pollinators for crop pollination. Second, they act as refugia for pollinators that can recolonize degraded agricultural areas. Management tools, such as grazing, fire, and mowing can be used in a manner that benefits pollinators. The use of insecticides and herbicides can be harmful to pollinators; if they must be used, best management practices can minimize their impact on pollinators.

3.2.3 Special Status Species

California's rangelands are some of the least protected habitats in California yet they support an extraordinarily high number of imperiled species. A total of 104 federally-listed threatened or endangered species have documented occurrences within California's Rangeland Ring, yet it only accounts for 14% of the state's total land area. The Rangeland Ring alone has more listed species than any other state with the exception of Hawaii, Alabama, and Florida. A total of 30 federally-listed threatened or endangered species occur within the potential CFLA program area (Table 3.5). Many of these species are vernal pool-dependent species. The program area contains more than half of the critical habitat for nine listed species, and also contains a significant portion of the core recovery areas identified in the Recovery Plan for Vernal Pool Species – nearly 80% of the southern Sierra

USFW

California Condor.

Foothills recovery unit. Table 3.5 lists the Federal California listed species occurring within the potential program areas and summarizes their habitat needs and distribution.

The Rangeland Ring includes nearly 1,000 miles of streams designated critical habitat (CH) for the threatened Central Valley steelhead and over 500 miles of CH for the Central Valley spring-run chinook salmon. This represents over 40% of the total CH for both species. In addition, the Rangeland Ring includes significant portions of the critical habitat for other federal-listed salmonids, including the threatened South Central California Coast steelhead (352 miles), Southern California steelhead (226 miles), and Central California Coast steelhead (420 miles). A relatively small portion of this critical habitat occurs within the potential program area: California Central Valley Steelhead (15 miles) and South Central California Coast Steelhead (109 miles). Environmental change resulting from reservoirs, dams, and diversions however, has been identified as the primary cause of the decline of seven fish species in the Sierra Nevada and as a contributing factor to the decline of 13 other species. Environmental change has also contributed to non-native species invading stream reaches both upstream and downstream of reservoirs (Moyle *et al*. 1996).

Principal species of concern for the CFLA proposal and their habitats are addressed in the following Recovery Plans:

- Recovery Plan for Upland Species of the San Joaquin Valley, California
- Recovery Plan for Vernal Pool Ecosystems of California and Southern Oregon
- Recovery Plan for the California Condor
- Recovery Plan for the California Red-legged Frog
- Recovery Plan for Gabbro Soil Plants of The Central Sierra Nevada Foothills

Not all of the species covered in multi-species recovery plans are present in the proposed program area, but are present in the larger foothill ring. Each of the plans provides information on the urgency to protect and restore species habitats and outline conservation priorities for the listed species.

3.3 Socioeconomic Environment

The potential program areas, including portions of Kern, Mariposa, Merced, San Benito, Stanislaus, and Tulare counties, comprises the local economic region for this analysis. Collectively, the six counties have a population of 2,125,576 people and total land area of approximately 19,223 mi^2 (U.S. Census Bureau 2010b; 2012).

3.3.1 Population

Table 3.6 shows the population estimates and trends for the six counties that comprise the study area. The six counties combined have slightly more than 2.1 million residents, accounting for approximately 5.7% of California's total population (U.S. Census Bureau 2010b). Within the study area, Kern County is the most populated with nearly 840,000 residents, and Stanislaus has the highest population density at 344 persons per square mile (U.S. Census Bureau 2012). Mariposa County is the least populated with 18,000 residents, and has the lowest population density at 13 persons per square mile. Each of the six counties in the regional economic setting experienced positive population growth from

Table 3.5 - Federal & California Listed Species Occurring within the Potential Program Area.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Birds			
Bald eagle	-/E	Foraging habitat areas defined by diversity, abundance, and vulnerability of the prey base, structure of aquatic habitat, such as the presence of shallow water, and absence of human development and disturbance. Typically breeds in forested areas adjacent to large bodies of water. Nests in trees, rarely on cliff faces and ground nests in treeless areas. In some cases, distance to water is not as critical as the quality of the foraging area that is present.	Bald eagles winter throughout most of California at lakes, reservoirs, rivers, and some rangelands and coastal wetlands. The State's breeding habitats are mainly in mountain and foothill forests and woodlands near reservoirs, lakes, and rivers. Most breeding territories are in northern California, but occur in scattered locations in the central and southern Sierra Nevada mountains and foothills, in several locations from the central coast range to inland southern California, and on Santa Catalina Island
California condor*	E/E	Inhabit large areas of open savannah, grasslands, and foothill habitat with rock outcrops and large trees for nesting and roosting. They nest on a bare surface on the floor of a cave, in a cliff face, on a steep slope, or in cavities in very large trees. Foraging habitat consists of grassland, savannah, and other foothill habitats with open areas suitable for landing and taking off.	Current distribution in California restricted to a wishbone-shaped area that generally extends from the Coastal Range (San Benito and Monterey counties in the north, to Ventura and Los Angeles counties in the south), to the Transverse Range including the Tehachapi Mountains of Kern and Los Angeles counties, and the southern Sierra Nevada Range (Tulare and Kern counties). They nest at elevations between 2,000-6,500 ft but can be found at elevations between sea level and 9,000 ft.
Southwestern willow flycatcher*	E/E	The willow flycatcher is a neotropical migrant, thus occurs in California primarily between the months May through September. It occurs in riparian habitats along rivers, streams, or other wetlands, where dense growths of willows and other plants grow. They nest in thickets of trees and shrubs.	The southwestern willow flycatcher was formerly common and widely distributed in California riparian areas, but is now considered rare to local in California. This subspecies is known to nest along the South Fork Kern River in Kern
Swainson's hawk	-/T	Prefer open habitats. Within California, they favor agricultural areas, riparian areas, and oak savannas_In the summer months, these hawks primarily eat insects, birds, and small mammals.	Widely occurring throughout western North America. Occurs in Colusa, Fresno, Glenn, Kern, Kings, Madera, Merced, Sacramento, San Joaquin, Stanislaus, Sutter, Tehama, Tulare, and Yolo counties.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Mammals			
Fresno Kangaroo rat*	E/E	The Fresno kangaroo rat habitat is on elevated grassy patches on alkali plains or in grassy terrain with scattered alkali patches. Both habitat types are characterized by easily dug friable soils in which the Fresno kangaroo rat digs burrow complexes. The primary food source for this kangaroo rat is seeds from native and non-native forbs and grasses.	The historical distribution of the Fresno kangaroo rat included the San Joaquin Valley floor between the Merced River to the north, the Fresno Slough to the west, the Kings River to the South and the towns of Fresno and Selma to the east. The current distribution is unknown.
Giant kangaroo rat*	E/E	Prefer annual grassland on gentle slopes of generally less than 10°, with friable, sandy-loam soils. However, most remaining populations are on poorer, marginal habitats which include shrub communities on a variety of soil types and on slopes up to about 22°. They develop burrow systems with one to five or more separate openings. They build vertical shaft burrows with a circular opening and no dirt apron and larger, more horizontally-opening shaft burrows, usually wider than high with a well-worn path leading from the mouth.	Historical habitat was estimated to have included over one and a half million acres from the base of the Tehachapi Mountains, Kern County, in the south, to near Los Banos, Merced County, in the north, whereas today extant habitat is estimated to be 27,540 acres, about 2 percent of historical habitat. The population is currently fragmented into six major geographic units located in the southern San Joaquin Valley of Kern and Kings counties. The major units are heavily fragmented within a highly developed landscape.
Nelson's antelope squirrel	-/T	Inhabits the arid grassland, shrubland, and alkali sink habitats of the San Joaquin Valley and adjacent foothills. The squirrels are active year-round and live in burrows that are either modifications of kangaroo rat burrows or ones the squirrels constructed themselves. They are omnivores whose diets may include green vegetation, fungi, seeds, and more commonly, insects.	Found at elevations of 165 feet on the floor of the San Joaquin Valley to around 3,609 feet in the Temblor Mountains. In 1979, substantial populations were located within the areas around Lokern and Elk Hills in western Kern County and on the Carrizo and Elkhorn Plains in eastern San Luis Obispo County. Since 1979, San Joaquin antelope squirrels have disappeared from many of the smaller habitat clusters on the Valley floor.
San Joaquin kit fox*	E/T	Inhabit grasslands and scrublands, many of which have been extensively modified. They also occur in modified habitats including those with oil exploration and extraction equipment and wind turbines, and agricultural mosaics of row crops, irrigated pastures, orchards, vineyards, and grazed annual grasslands. Oak woodland, alkali sink scrubland, and vernal pool and alkali meadow communities also provide habitat for kit foxes. Dens are scarce in areas with shallow soils.	Much reduced from its former extent, the San Joaquin kit fox currently found mostly in the southern and western San Joaquin Valley and surrounding foothills

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Tipton kangaroo rat*	E/E	Tipton kangaroo rats maintain shallow interconnecting burrow systems are usually in open areas but may occur in areas of thick scrub. They are commonly in slightly elevated mounds, the berms of roads, canal embankments, railroad beds, and bases of shrubs and fences where windblown soils accumulate above the level of surrounding terrain. Terrain not subject to flooding is essential for permanent occupancy.	Historically ranged over 1.7 million acres of arid valley floor lands of the Tulare Basin. Reduced by 1985 to 60,000 acres due to agriculture and urbanization. Current occurrences are limited to scattered, isolated areas. In the southern San Joaquin Valley this includes the Kern National Wildlife Refuge, Delano, and other scattered areas within Kern County. In Kings County, two populations of San Joaquin kangaroo rats have been found on about 371 acres in 1994 and 1995.
Amphibians and reptiles			
Blunt-nosed leopard lizard*	E/E	Inhabits open, sparsely vegetated areas of low relief on the Valley floor and the surrounding foothills. It also inhabits alkali playa and valley saltbush scrub. In general, it is absent from areas of steep slope, dense vegetation, or areas subject to seasonal flooding. The currently occupied range consists of scattered parcels of undeveloped land on the Valley floor, most commonly annual grassland and valley sink scrub.	This species is found only in the San Joaquin Valley and adjacent foothills, as well as the Carrizo Plain and Cuyama Valley
California red-legged frog*	T/-	Adults need dense, shrubby or emergent riparian vegetation closely associated with deep (greater than 2 1/3-foot deep) still or slow moving water. Largest densities are associated with deepwater pools with dense stands of overhanging willows and an intermixed fringe of cattails. Well-vegetated terrestrial areas within the riparian corridor may provide important sheltering habitat during winter. California red-legged frogs estivate in small mammal burrows and moist leaf litter.	Endemic to California and Baja California, Mexico, at elevations ranging from sea level to 5,000 feet. Records of the California red-legged frog are known from Riverside County to Mendocino County along the Coast Range; from Calaveras County to Butte County in the Sierra Nevada; and in Baja California, Mexico. Only isolated populations have been documented in the Sierra Nevada.
California tiger salamander	T/T	Restricted to vernal pools and seasonal ponds, including many constructed stock ponds, in grassland and oak savannah plant communities, predominantly from sea level to 2,000 feet.	Restricted to California and does not overlap with any other species of tiger salamander. Inhabits Central Valley and Sierra Nevada foothills from Yolo to Kern counties.
Sierra Madre yellow-legged frog	E/EC	This species is always encountered within a few feet of water. In the Sierra, it is associated with streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitats. In southern California, populations are restricted to streams in ponderosa pine, montane hardwood-conifer, and montane riparian habitats. Elevation range in the Sierra extends from 4,500 ft to over 11,980 ft and in southern California from 1,200 ft -7,500 ft.	Occurs in the Sierra Nevada from Fresno Co. to Kern Co. In southern California, isolated populations exist in the San Gabriel, San Bernardino, and San Jacinto Mountains. The southern-most group is an isolated population on Mt. Palomar in San Diego County.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Tehachapi slender salamander	-/T	Inhabits north-facing moist canyons and ravines in oak and mixed woodlands in arid to semi-arid locations. Found under rocks, logs, bark, and other debris in moist areas, especially in areas with a lot of leaf-litter, often near talus slopes. At elevations of 2,000 - 4,600 ft.	Endemic to California. Found in scattered populations in the Caliente Creek drainage at the juncture of the Sierra Nevada and the Tehachapi mountains, and in isolated canyons on the northern slopes of the Tehachapi Mountains from Tejon Canyon to Fort Tejon.
Invertebrates			
Conservancy fairy shrimp*	E/-	Conservancy fairy shrimp inhabit rather large, cool-water vernal pools with moderately turbid water. The pools generally last until June. However, the shrimp are gone long before then. They have been collected from early November to early April.	Currently, eight populations are known (from north to south): (1) Vina Plains, Butte and Tehama counties; (2) Sacramento National Wildlife Refuge, Glenn County; (3) Yolo Bypass Wildlife Area, Yolo County; (4) Jepson Prairie, Solano County; (5) Mapes Ranch, Stanislaus County; (6) University of California, Merced, Merced County; (7) Grasslands Ecological Area, Merced County and (8) Los Padres National Forest, Ventura County.
Kern primerose sphinx moth*	T/-	Habitat for this moth consists of sandy washes with open soil for morning basking, young alluvial sandy soils that support the food plant sun cups (*Camissonia campestris*) and with soil that is loose enough to allow larvae to burrow and construct shallow pupal chambers, and sufficiently dense stands sun cups that allow Kern primrose sphinx moth larvae to travel from stand to stand as they consume their host plants.	When the recovery plan was issued in 1984, the only know populations were in the Walker Basin within the southern Sierra. Since that time, the known distribution has expanded as a result of the discovery of six confirmed populations of Kern primrose sphinx moth at the Carrizo Plain National Monument (Carrizo Plain) in San Luis Obispo County and of five populations in the Cuyama Valley in Santa Barbara and Ventura Counties.
Valley elderberry longhorn beetle*	T/-	The species is nearly always found on or close to its host plant, elderberry shrub. Use of elderberry is rarely apparent, usually indicated by a stem exit hole created by the larva just before the pupal stage. Field work along the Cosumnes River and in the Folsom Lake area suggests that larval galleries can be found in elderberry stems with no evidence of exit holes.	At the time of listing in 1980, the beetle was known from less than 10 locations on the American River, Putah Creek, and Merced River. Now it is known to occur from southern Shasta County to Fresno County.
Vernal pool fairy shrimp*	T/-	The vernal pool fairy shrimp occupies a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. The species tends to occur in smaller pools (<0.05 acre) but can be found in large pools (<25 acres). These are most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands.	The vernal pool fairy shrimp was identified relatively recently, in 1990, and there is little information on the historical range of the species. However, the vernal pool fairy shrimp is currently known to occur in a wide range of vernal pool habitats in the southern and Central Valley areas of California.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Vernal pool tadpole shrimp*	E/-	The vernal pool tadpole shrimp has a patchy distribution across the Central Valley of California, from Shasta County southward to northwestern Tulare County, with isolated occurrences in Alameda and Contra Costa counties. Although vernal pool tadpole shrimp are spread over a wide geographic range, their habitat is highly fragmented and they are uncommon where they are found.	There are 226 reported occurrences of vernal pool tadpole shrimp in the following 19 counties: Alameda, Butte, Colusa, Contra Costa, Fresno, Glenn, Kings, Merced, Placer, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo, and Yuba. Sacramento County contains 28%, the greatest amount, of the known occurrences.
Plants			
Bakersfield cactus*	E/E	Occurs on flood plains, ridges, bluffs and rolling hills in saltbush scrub plant communities, and occasionally in blue oak woodland or riparian woodland at elevations from 460 to 1,800 feet. Soils supporting Bakersfield cactus typically are sandy, although gravel, cobbles, or boulders also may be present.	Distribution is restricted to a limited area of central Kern County near Bakersfield. Once extensive colonies existed around Bakersfield, along the bluffs of the Kern River, along the Caliente Creek drainage and nearby foothills of the Tehachapi Mountains, and south to the Tejon Hills. Current distribution is fragmented and much reduced.
Boggs Lake hedge hyssop	-/E	Grows on clay substrates in vernal pools, small playa-type pools, marshy areas, on the lake margins, borrow pits and cattle ponds. Found in several types of vernal pools such as those with northern basalt flow, northern claypan, northern hardpan, and northern volcanic ashflow or mudflow substrates. Occurs within annual grassland, oak woodland, juniper woodland, and conifer forest communities	Currently, there are 85 known occurrences which are "presumed extant" in California, including populations in Fresno, Lassen, Madera, Merced, Modoc, Placer, Sacramento, San Joaquin, Shasta, Siskiyou, Solano and Tehama Counties, as well as one occurrence in Oregon. Known sites in California range in elevation from 25 feet in Solano County to 5,170 feet in Modoc County.
Chinese Camp brodiaea	T/E	Grows in overflow channels, seeps, and springs in clays, which may be derived from serpentine soils.	This species is a California endemic limited to two small, known populations along limited stretches of intermittent streams in the Sierra Nevada foothills of Tuolumne and Calaveras counties.
Colusa grass*	T/E	Grows on the rim of alkaline basins in the Sacramento and San Joaquin Valleys, as well as on acidic soils of alluvial fans and stream terraces along the eastern margin of the San Joaquin Valley and into the adjacent foothills. Elevations range from 18-105 ft at known sites. Found in northern claypan and northern hardpan vernal pool types within rolling grasslands in pools ranging from 0.02 -617.5 acres. Also occurs in the beds of intermittent streams and in artificial ponds, often in deep portions.	Currently, no more than 42 occurrences remain extant; at least one population remains in each of its historic the vernal pool regions. The majority of occurrences are in the Southern Sierra Foothills, where they are concentrated northeast of the City of Merced in Merced County and east of Hickman in Stanislaus County. One or two occurrences remain in central Merced County. Occurrences are extant in southeastern Yolo and central Solano counties.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Greene's tuctoria*	E/R	Found in three types of vernal pools: Northern Basalt Flow, Northern Claypan, and Northern Hardpan on both low and high terraces. Occupied pools are or were underlain by iron-silica cemented hardpan, tuffaceous alluvium, or claypan. Most recent estimates indicate inhabitated pool sizes between 1.5 to 8.4 acres, and Central Valley pools were in grasslands with elevations of 110 -440 ft.	Reported from 41 occurrences in Butte, Fresno, Madera, Merced, San Joaquin, Stanislaus, Tehama, Tulare and Shasta counties, and nearly half of the historical occurrences are presumed extant and others extirpated or possibly extirpated. The majority of the 22 extant occurrences are in the northeastern Sacramento Valley, while the next largest concentration is in the Southern Sierra Foothills where the only remaining occurrences are in eastern Merced County. It is believed now to be extirpated from Fresno, Madera, San Joaquin, Stanislaus, and Tulare counties.
Hairy Orcutt grass*	E/E	Found on stream terraces and alluvial fans, and in Northern Basalt Flow, Northern Claypan, and Northern Hardpan vernal pools located within annual grasslands. The median size of occupied pools 4.2 acres (0.8 - 617.5 acres), and is known from elevations of 85 –405 ft. The species is found on both acidic and saline-alkaline soils, in pools with aniron-silica cemented hardpan or claypan.	Of 39 recorded occurrences, 27 natural occurrences and an introduced population are presumed to be extant, and with concentrations being in the Northeastern Sacramento Valley. Extant occurrences in the Solano-Colusa area are on the Sacramento National Wildlife Refuge. There are 11 occurrences in the Southern Sierra Foothills (nine in Madera County and two in eastern Stanislaus County).
Hartweg's golden sunburst	E/E	Occurs in open grasslands and grasslands at the margins of blue oak woodland, primarily on shallow, well-drained, fine-textured soils, nearly always on the north or northeast facing of mima mounds. These are mounds of earth, of unknown origin, are roughly 1-6 feet high and 10-100 feet in diameter at the base, interspersed with basins that may pond water in the rainy season.	The species is found only in the Central Valley of California. Historically, the range of the species may have extended from Yuba County south to Fresno County, a range of 200 miles. Within this range, the species was only locally abundant. Today, there are 19 presumed extant populations on the eastern edge of the San Joaquin Valley. Remaining populations are concentrated in the Friant region of Fresno and Madera counties and the La Grange region in Stanislaus County.
Hoover's spurge*	T/-	Hoover's spurge generally grows in relatively large, deep vernal pools among the rolling hills, remnant alluvial fans and depositional stream terraces at the base of the Sierra Nevada foothills. It tends to occur where competition from other species has been reduced by prolonged seasonal inundation or other factors.	There are around 30 known or presumed extant occurrences in Tehama, Butte, Glenn, Stanislaus, Merced, and Tulare counties. Some have not been surveyed for many years however. Most of the occurrences are in the Vina Plain area of Tehama and Butte Counties. Another concentration is in the Southern Sierra Foothills, including the Visalia-Yettem area of Tulare County and the Hickman-La Grange area of Stanislaus County.
Ione manzanita (heath family)	T/-	Ione manzanita is the dominant and characteristic species of Ione chaparral, where it occurs in pure stands. The Ione chaparral plant community occurs only on very acidic, nutrient -poor, coarse soils, and is comprised of low-growing, heath-like shrubs and scattered herbs. It also occurs in transitional zones with surrounding taller chaparral types, but it does not persist if shaded. The populations range in elevation from190-1,900 ft, with most between 295-900 ft.	Occur in about 100 stands covering nearly 1,000 acres. It occurs primarily on outcrops of the Ione Formation within an area of about 35 sq. miles in Amador County. In addition, a few disjunct populations occur in Calaveras County.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
Keck's checkerbloom (mallow family)	E/-	Associated with serpentine and other soils that tend to restrict competing vegetation. As with many serpentine species, Keck's checkerbloom appears to compete poorly with densely growing non-native annual grasses. At the Piedra population, it grows on both Fancher and Cibo soils, and occurs between 600-1,000 ft in elevation. The Mine Hill population occurred on 20- 40% slopes of red or whitecolored clay in sparsely-vegetated annual grasslands.	At the time of listing in 2000, Keck's checkerbloom was extremely localized, with one extended population at Mine Hill in Tulare County (Mine Hill population) and another population at Tivy Mountain near the community of Piedra, in southern Fresno County.
Kaweah brodiaea	-/E	Inhabits the blue oak and valley grassland plant communities of Tulare County.	This plant is found only in the drainage of the Kaweah and Tule Rivers, Tulare County.
Mariposa pussypaws	T/-	Grows in treeless, sparsely-vegetated areas such as granite domes and gravelly openings within foothill woodland communities. The Fresno County occurrence is on a granite outcrop that was once covered with chaparral vegetation but has been converted to grassland.	Mariposa pussypaws is reported from 9 or 10 occurrences in Mariposa, Madera, and Fresno counties (occurring within a range of 40 miles). The main center of distribution is in Mariposa County, south of the town of Mariposa. Another area of concentration is near Coarsegold in Madera County, and a minor concentration area is the Jose Basin in Fresno County.
Mariposa lupine	T/-	Grows on decomposed granitic sands on ridge tops and hillsides in openings in foothill woodlands from 1,400 -1,900 ft.	Inhabits western foothills of the Sierra Nevada Mountains from Jamestown in Tuolumne County, to Bodfish in Kern County, to near Grapevine in the foothills of the Tehachapi Mountains in Kern County. The four known populations occur on private lands in Mariposa County over a 115 sq mi area. Two of the four populations co-occur with Mariposa pussypaws.
San Benito evening primrose*	T/-	Known sites occur below 4,500 ft on relatively stabilized, gently sloping alluvial flats and terraces subject to frost heaving and with < 25% chaparral; however, some occurrences of the species are at the base of slopes where there is a greater potential for deposition of material moving from above (debris flows). There are currently less than 427 acres of suitable habitat throughout its range.	This species is restricted to near San Benito Mountain within and adjacent to the Clear Creek Management Area (CCMA) in southern San Benito and extreme western Fresno County in the Central Coast Range of California. The known distribution comprises 69 known populations.
San Joaquin adobe sunburst*	T/E	Suitable habitat is now almost entirely on private lands on grasslands and in the transition zone between grassland and blue oak woodland at elevations between 390 -2,600 feet, and on level or gently sloping areas between low hills. It can grow in fairly dense grass cover, but optimal habitat appears to be a landscape sparsely vegetated with a mixture of grasses and forbs.	Found at 32 "presumed" extant occurrences distributed in Fresno, Tulare, and Kern counties. Major concentrations are east of Fresno in Fresno County, west of Lake Success in Tulare County, and northeast of Bakersfield in Kern County.

Species	*Federal/ Calif.*	*Habitat*	*Distribution*
(E-endangered; T-threatened; C-candidate; R-rare (Calif); P-proposed listing; - no status; *species has federal recovery plan)			
San Joaquin Valley Orcutt grass*	T/E	Occurs on alluvial fans, high and low stream terraces, and tabletop lava flows in northern claypan, northern hardpan, and northern basalt flow vernal pools	Limited to vernal pool landscapes in the foothills of the southern Sierra Nevada from Merced to Tulare County.
San Joaquin woollythreads* (sunflower family)	E/-	Occurs in nonnative grassland, valley saltbush scrub, Interior Coast Range saltbush scrub, and upper Sonoran subshrub scrub.	Many new occurrences of San Joaquin woolly-threads have been discovered in the last two decades, primarily in the hills and plateaus west of the San Joaquin Valley. These constitute four meta-populations and several small, isolated populations. The largest metapopulation occurs on the Carrizo Plain Natural Area, San Luis Obispo County directly east of Kern County
Springville clarkia	T/E	Found on granitic soils in openings in the blue oak woodlands and on the uphill slope of road banks, on small decomposing granite domes, and sunny openings. It can be found at elevations between 1,200 -3,000 feet.	All known populations are found in Tulare County. Eighteen occurrences have been recorded. Most of the populations are found within a 43 square mile area but only on 244 acres within the Tule River drainage of the western Sierra Nevada. The largest known occurrence is on the Springville Clarkia Ecological Reserve, California Department of Fish and Wildlife.
Striped adobe lily	-/T	This bulbous perennial open grassland species appears to be restricted to some of the heavy clay (adobe) soils.	This localized endemic is known to occur along the eastern side of the San Joaquin Valley and in the foothills of the southern Tehachapi range foothills, Sierra Nevada, and the Tejon Mountains to the west at only about 12 sites in Kern and Tulare counties.
Succulent owl's -clover*	T/E	Succulent owl's-clover is found only in vernal pools, swales, and seasonal wetlands along the rolling lower foothills and valleys, often on acidic soils.	It occurs along the eastern San Joaquin Valley in the Southern Sierra Nevada foothills.
San Joaquin adobe sunburst*	T/E	Suitable habitat is now almost entirely on private lands on grasslands and in the transition zone between grassland and blue oak woodland at elevations between 390 -2,600 feet, and on level or gently sloping areas between low hills. It can grow in fairly dense grass cover, but optimal habitat appears to be a landscape sparsely vegetated with a mixture of grasses and forbs.	Found at 32 "presumed" extant occurrences distributed in Fresno, Tulare, and Kern counties. Major concentrations are east of Fresno in Fresno County, west of Lake Success in Tulare County, and northeast of Bakersfield in Kern County.

Sources: http://www.fws.gov/sacramento/es_species/Accounts/Home/es_species.htm, http://www.dfg.ca.gov/wildlife/nongame, http://www.bna.birds.cornell, http://www.scwa2.com/documents/hcp/Final/AdminDraft/, http://www.esrp.csustan.edu/speciesprofiles/profile.php?sp=gyca, http://www.xerces.org/kern-primrose-sphinx-moth/, http://esrp.csustan.edu/speciesprofiles/profile.php?sp=amne, http://www.dfg.ca.gov/biogeodata/cwhr/, http://esrp.csustan.edu/projects/lsm2/, https://rm.dfg.ca.gov/FileHandler.ashx?DocumentVersionID=3722, http://esrp.csustan.edu/projects/lsm2/,

Table 3.6 - Population estimates for California counties that contain potential CFLA Program Areas

Area	*Population (2010)*	*Persons per Square Mile (2010)*	*Population Change (2000-2010)*	*Projected Population Change (2010-2030)*
California	37,253,956	239	10.0%	19%
Kern County	839,631	103	26.9%	52%
Mariposa County	18,251	13	6.5%	20%
Merced County	255,793	132	21.5%	40%
San Benito County	55,269	40	3.8%	7%
Stanislaus County	514,453	344	15.1%	29%
Tulare County	442,179	92	20.2%	44%

U.S. Census Bureau, 2012; California Department of Finance, 2012 (forecasted population change)

Bureau of Labor Statistics, 2012 (2011 annual unemployment rate); U.S. Census Bureau, 2010a (poverty rate, median household income, and educational attainment)

2000 to 2010. Kern County grew the fastest during this time, while San Benito County grew the slowest, at 26.9%and 3.8%, respectively (U.S. Census Bureau, 2012). The populations for each of the six counties are projected to maintain positive population growth through the year 2030, ranging from 7% to 52% growth for San Benito and Kern counties, respectively (California Department of Finance 2012).

3.3.2 Prosperity, Education, Race, and Ethnicity

Median household income, poverty rate, percentage of the population with a bachelor's degree or higher, and the average unemployment rate for each of the six counties in the study area are shown in Table 3.7. Within the six-county study area, San Benito County has the highest median income at $65,771, while Merced and Tulare Counties have the lowest at $43,850 (U.S. Census Bureau 2010a). Tulare County has the highest poverty rate among the six counties, with nearly 23% of the population living at or below the federal poverty line. Merced County has the highest annual average

Table 3.7 - Poverty, unemployment, income, and education statistics for California counties that contain potential CFLA program areas.

Area	*Median Household Income (2010)*	*Poverty Rate (2010)*	*Average Unemployment Rate (2011)*	*Percentage of Population With Bachelor's Degree or Higher (2010)*
California	$60,883	13.7%	11.7%	30.1%
Kern County	47,089	20.6%	14.9%	14.7%
Mariposa County	49,098	12.5%	11.8%	20.4%
Merced County	43,844	21.8%	18.3%	12.5%
San Benito County	65,771	11.7%	15.7%	18.3%
Stanislaus County	51,094	16.4%	16.8%	16.3%
Tulare County	43,851	22.9%	16.6%	13.0%

Bureau of Labor Statistics, 2012 (2011 annual unemployment rate); U.S. Census Bureau, 2010a (poverty rate, median household income, and educational attainment)

unemployment rate for 2011 at 18.3% (BLS 2012). Comparatively, San Benito County has the lowest poverty rate at 11.7% and Mariposa County has the lowest average unemployment rate in 2011 at 11.8% among the six-county program area.
There exists some variability in educational attainment among the six counties in the study area as indicated by the percentages of residents with a bachelor's degree or higher. As shown in Table 3.7, approximately 20% of residents in Mariposa County have a bachelor's degree or higher, compared to 12.5% and 13% of residents in Merced and Tulare counties, respectively (U.S. Census Bureau, 2010a).

Significant differences exist between the six counties in terms of the percentage of residents who identify ethnically as Hispanic or Latino. Approximately 10% of the population identify as Hispanic or Latino in Mariposa County, compared to 57% and 61% of the residents in San Benito and Tulare counties, respectively (U.S. Census Bureau 2010a). Similar differences exist in the frequency of residents who identify racially as White between the six counties in the study area: more than 82% of the population in Mariposa County identify as White, compared to 32% and 37% of the residents in San Benito and Kern counties, respectively (U.S. Census Bureau 2010a).

3.3.3 Regional Employment

Table 3.8 shows the percent employment by sector within the six-county area. The combined six-county area has a total employment of more than 881,000 individuals in 2011 (Bureau of Economic Analysis, 2012). Farm employment accounts for nearly 6% of the workforce. Forestry, fishing, and related activities account for over 7% of the total employment by sector. The highest percentage of total employment is found in the government and government enterprise sector (16.2% of total employment). Most of this sector is state and local government agencies. The second and third highest percentage of total employment is in retail trade (10.4%) and health care and social assistance (9.4%).

3.3.4 Agriculture

Located in the San Joaquin Valley, Kern, Merced, Stanislaus, and Tulare are four of the most agriculturally productive counties in California (California Agricultural Statistics Review, 2011). The four counties combined have a gross annual agriculture production value of more than $14.9 billion (excluding timber production). Nearly one-quarter of the total gross value of agricultural production for these counties, or approximately $3.4 billion, comes from milk production alone. Other significant agricultural products for these counties are grapes, almonds, cattle, chickens, oranges, silage corn, walnuts, alfalfa hay, cotton, peaches, chicken eggs, and sweet potatoes.

Mariposa and San Benito counties have a combined annual agricultural production value of $282 million, which is significantly smaller than Kern, Merced, Stanislaus, and Tulare counties' combined $14.9 billion (California Agricultural Statistics Review 2011). Cattle and calf production is the number one commodity for Mariposa County with more than $15 million in annual gross value, while vegetables are the number one commodity for San Benito County with $41 million in annual gross value. Range pasture, poultry, lettuce, bell peppers, nursery products, grapes, fruits, nuts, and other livestock products (e.g., chicken, duck, ostrich and geese eggs, turkey hatching eggs, goat milk, and exotic wools) are other significant agricultural products for Mariposa and San Benito counties.

3.3.5 Conservation and Ecosystem Service Values

Ecosystems are integrated natural communities stemming from the interactions between humans, animals, and the physical environment. The interactive functions of rangeland ecosystems provide a suite of 'services' that are important socially, culturally, and economically. However, many ecosystem services are 'public' and 'non-market' in their nature. That is, they often benefit many people, whether or not they have paid for them, and they are typically not sold in a traditional market setting where a relative price is revealed for the good or service. These characteristics often underscore the

Table 3.8 - Percentage employment by sector for California counties that contain Potential CFLA Program Areas

Industry	Number of Jobs (2011)	Percent of Total
Total Employment	881,349	
Wage and salary employment	700,316	79.5%
Proprietors employment	181,033	20.5%
Farm proprietors employment	12,598	1.4%
Nonfarm proprietors employment	168,435	19.1%
Farm employment	51,147	5.8%
Private (Non-farm) employment	687,853	78.0%
Forestry, fishing, and related activities	63,973	7.3%
Mining	14,685	1.7%
Utilities	2,503	0.3%
Construction	40,539	4.6%
Manufacturing	58,222	6.6%
Wholesale trade	17,606	2.0%
Retail trade	91,232	10.4%
Transportation and warehousing	31,254	3.5%
Information	7,459	0.8%
Finance and insurance	27,055	3.1%
Real estate and rental and leasing	31,639	3.6%
Professional, scientific, and technical services	33,153	3.8%
Management of companies and enterprises	7,175	0.8%
Administrative and waste management services	45,405	5.2%
Educational services	7,819	0.9%
Health care and social assistance	82,946	9.4%
Arts, entertainment, and recreation	10,719	1.2%
Accommodation and food services	52,396	5.9%
Other services, except public administration	46,563	5.3%
Government and government enterprises	142,349	16.2%
Federal, civilian	14,610	1.7%
Military	6,068	0.7%
State and local	104,348	11.8%

Bureau of Economic Analysis 2010

true value of such goods and services and lead to them being overlooked or under-provided in private decision-making. Thus, conservation and restoration efforts usually stem from the coordination of government agencies and public trusts.

Nonetheless, nearly all of these services can be looked at from an altruistic viewpoint with underlying economic values. For instance, superior flood attenuation qualities of conserved open space can limit damages to homes, businesses, and production activities in the floodplain; natural water purification properties reduce the amount of costly treatment needed to meet drinking water standards; and habitat benefits of conservation practices may result in more waterfowl for hunters to pursue, resulting in more people traveling to and spending money in an area. It is the link between ecological processes and human well-being that defines ecosystem services and provides the context for valuing various land use decisions (Daily *et al.* 1997; MEA 2003).

The rangelands within the potential CFLA program areas produce a host of ecosystem services valuable to Californians and beyond. Much of the study area consists of working cattle ranches, which have been known to bolster many ecosystem services and biodiversity (Marty 2005). It has been well established that pollination services are of crucial to crop production. Chaplin-Kramer *et al.* (2011) examined the impact of natural ecosystems, including rangelands, on pollinator services in California. From this study, they were able to estimate the total value of pollinator services provided by wild and managed honey bees. For California, the value of total pollinator services ranged from $2.7 to $6.3 billion. Kern and Stanislaus counties fall within the top three counties that derive the highest value from total pollinator services in the state. Native pollinators (wild bees) on wildland habitat supply between $937 million and $2.4 billion of pollination services per year to agriculturalists in California (Chaplin-Kramer 2011). Tulare County receives the highest level of benefit from wild pollinators while Kern County also falls within the top three counties. Furthermore, the existence of wild bees has been shown to increase the pollination efficiency of managed bees. Rangeland provides crucial habitat to wild bees, which in turn provide valuable services to California's agricultural communities (Chaplin-Kramer 2011).

Conserved working rangelands also increase biodiversity and keep migration paths intact, which can provide increased recreational activities such as hunting and bird watching (Moon and Haukos 2006; Jenkins *et al.* 2010). When properly managed, rangelands can decrease water borne pathogens (*Cryptosporidium parvum*, *Giardia duodenalis*, *E. coli*, etc.) by up to 99.9% (McDougald *et al.* 2008). The increased water quality protects against the spread of disease to humans and livestock. This disease prevention service has not been formally valued but is thought to have large economic impacts on humans and livestock in form of reduced medical expenses, mortality, and illness rates in livestock (Department for International Development 2012 and MEA 2005). All in all, ecosystem functions and the services provided by landscapes maintain economic significance and should be considered when analyzing decisions that alter land use, now or in the future.

3.3.6 Local Government Revenue

Local governments collect revenue through intergovernmental transfers, property taxes, sales taxes, personal income taxes, and other charges, such as permitting. These revenues are then spent to provide community services such as fire and police services, schools, infrastructure, and public spaces. Local government cost-to-revenue ratios are largely determined by land uses within their jurisdictions. Areas with residential development tend to have high cost-to-revenue ratios because these areas require the greatest number of municipal services. Conversely, areas with predominately agricultural and open-space uses tend to have lower cost-to-revenue ratios (American Farmland Trust 2001).

For most types of properties, county assessors use fair market value to determine property tax liabilities. The fair market value of land is the amount that a property is estimated to sell for in the current market. For agricultural land, this value includes both the productive value of the land and any speculative value associated with the possibility of developing the land. In California, property taxes are limited by Proposition 13 and the California Land Conservation Act (commonly referred to as the Williamson Act). Under Proposition 13, properties are reassessed to the current fair market value only upon a change in ownership or upon the completion of new construction, and property tax liabilities may increase annually by no more than two percent to adjust for inflation (California Board of Equalization 2009). This unique property tax law means that longtime property owners tend to have property tax liabilities that are substantially lower than the current fair market value of their property. Parcels classified as agricultural are generally assessed either under Proposition 13 or under the Williamson Act. The Williamson Act enables agricultural landowners to enter into contracts with their county government that require them to restrict land use on their parcel to agricultural or open space uses. In return, landowners receive special assessments on their land that are based only on the productive value of the land rather than the full fair market value (Department of Conservation 2012).

3.3.7 Land Use

The percentage of mixed cropland in Kern, Merced, Stanislaus, and Tulare counties is 21%, 42%, 37%, and 26%, respectively (National Agricultural Statistics Service 2011). An additional one-third of the total acreage in Merced and Stanislaus counties is grassland, while roughly one-fifth of the total acreage in Kern and Tulare counties is grassland. Mariposa and San Benito counties have comparatively less mixed cropland (0.04% and 3.4%, respectively) than the four Central Valley counties in the study area. Mariposa County has a large portion of land considered forested (43%) and San Benito County has a large portion that is grassland (44%).

Within the Rangeland Ring and potential program areas, substantial land use changes have occurred over the last quarter century. According to an analysis of California Department of Conservation Farmland Mapping and Monitoring Program data, nearly 290,000 acres of rangelands within the Rangeland Ring and 64,000 acres within the potential program areas have been converted to other land uses (Marty *et al*. 2012). Figures 6 and 7 show the sources of rangeland conversion in the Rangeland Ring and potential program areas. By far the largest source of conversion in the Rangeland Ring was rural residential development (103,000 acres). Other major sources of conversion included suburban residential development (44,000 acres), orchards (34,000 acres), vines and trellised olives (32,000 acres), and mineral entry (25,000 acres). Within the potential program areas, the largest sources of rangeland conversion were orchards (23,000 acres), rural residential (14,000 acres), and mineral entry (10,000 acres).

There are a variety of existing protected lands in the Rangeland Ring, including those adjacent to and within the potential program areas (Figure 3). Together with these lands, the CFLA easements would help protect several important linkage areas identified by the California Essential Habitat Connectivity Project. To the west and adjacent to the Central Sierra Foothills are large blocks Bureau of Land Management (BLM) land, as well as lands owned or managed by the U.S. Forest Service (Stanislaus National Forest), California Rangeland Trust, Central Valley Farmland Trust, Sierra Foothills Conservancy, The Nature Conservancy, California Department of Parks and Recreation, and Friends of the Tuolumne. The Southern Sierra Foothills are bordered on the east by Sequoia National Forest, Sequoia-Kings Canyon National Park, and BLM lands, and are bordered on the south by the Tejon Ranch Conservancy. Additional conservation ownerships within the Southern Sierra Foothills include California Department of Fish and Wildlife, Sequoia Riverlands Trust, Sierra Foothills Conservancy, and The Nature Conservancy. The Diablo Range portion of the program area is bordered by the National Park Service's Pinnacles National Park to the west, large BLM holdings to the east, and a short distance to the Grasslands Wildlife Management Area to the northeast. Major conservation ownerships within this area include California Department of Fish and Wildlife, Central Valley Farmland Trust, The Nature Conservancy, and California Department of Parks and Recreation.

California state law requires each county to prepare a comprehensive, long-term general plan to guide its future. General plans express each community's development goals and embody public policy relative to the distribution of future land uses, both public and private. General plans serve to:

- Identify the community's land use, circulation, environmental, economic, and social goals and policies as they relate to land use and development.
- Provide a basis for local government decision-making, including decisions on development approvals and exactions.
- Provide citizens with opportunities to participate in the planning and decision-making processes of their communities.
- Inform citizens, developers, decision-makers, and other cities and counties of the ground rules that guide development within a particular community (OPR 2003).

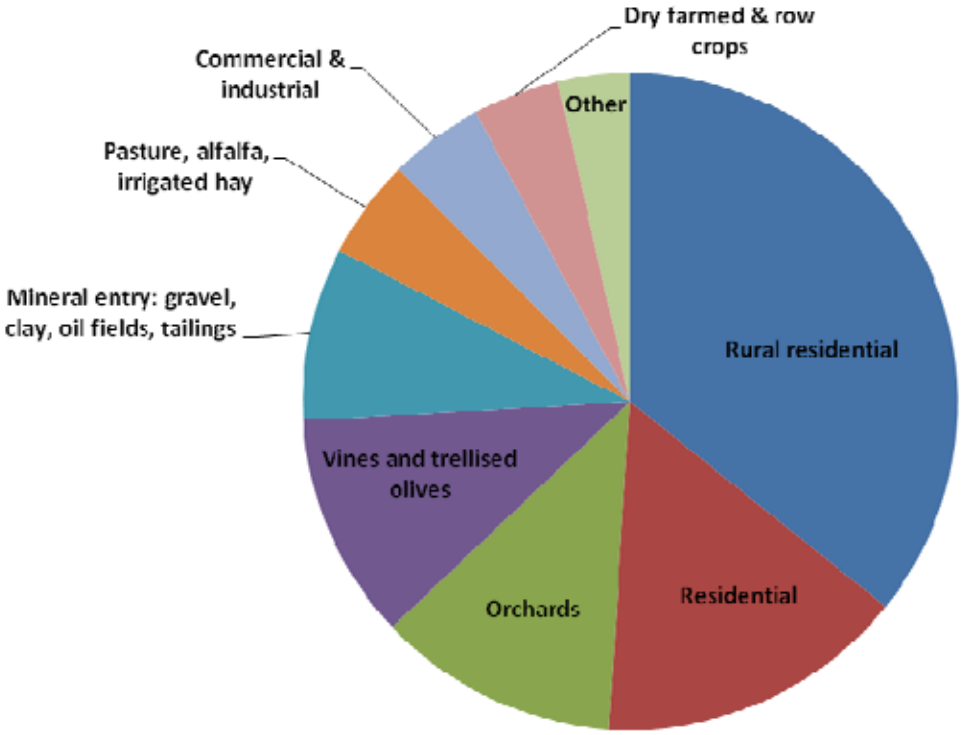

Figure 6. Sources of rangeland conversion in the Rangeland Ring, 1984-2008.

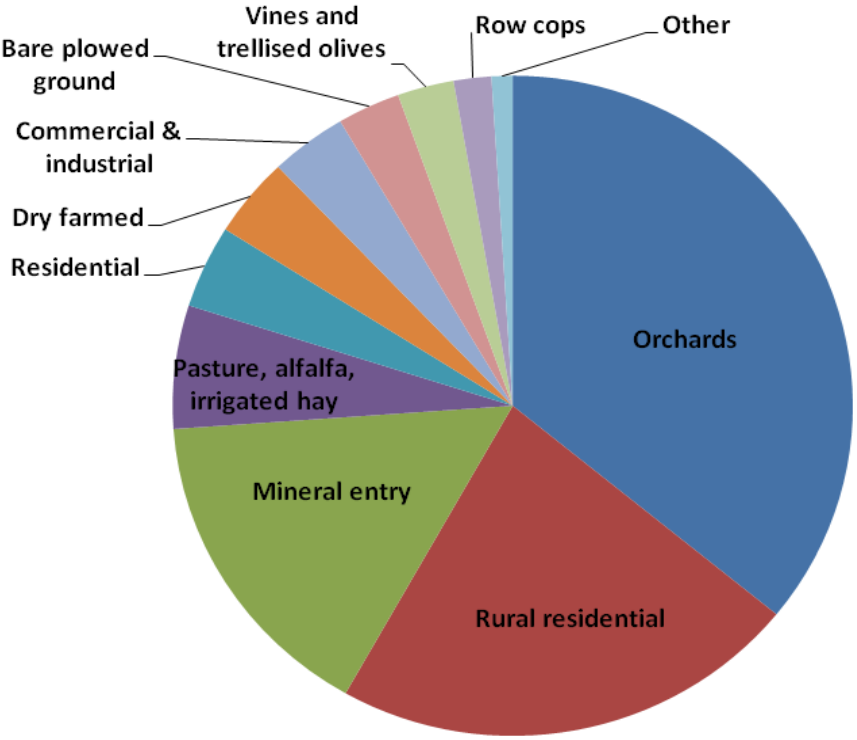

Figure 7. Sources of rangeland conversion in the potential program areas, 1984-2008.

Appendix D summarizes relevant goals, policies, and other provisions of potential program area county general plans. Figure 8 shows the breakdown of general plan land use designations within the proposed program area rangelands. The vast majority of rangelands with the potential program area have a general plan designation of either agriculture or open space (96%).

3.4 Cultural and Historic Resources

The foothills were favored by many Native American peoples. Tribes utilizing the foothills lived throughout California including the series of tribes living east of the Sacramento and San Joaquin valleys on the Cascade and Sierran slopes. These people -- from north to south -- were the Wintu, Yana, Foothill Maidu, Sierra Miwok, Monache (Western Mono, Uto-ztekan nation), Tubatulabal, Kawaiisu, Kitanemuk, and Alliklik tribes. The acorn was probably the most important dietary item in the foothills, with fish and game playing a lesser role. In summer the foothill tribes occupied the Sierra to the crest of the mountains and sometimes traveled east of it. But when the snows began, the tribal people and deer moved down below the snowline (<5,000 ft.). In many brushy or chaparral areas, Indians regularly set fires to create a more open countryside, improving conditions for traveling, hunting and collecting. The new growth of grass and shoots from shrubs provided food for grazing and browsing animals, and thus led to better hunting (Centers for Water and Wildland Resources 1996).

The Central Valley and surrounding foothills were only sparsely populated by European immigrants until the Gold Rush years. Between 1848 and 1859, some 300,000 immigrants arrived in California, lured primarily by the promise of gold but also populating lumber towns, ranches and town sites. California's Gold Rush helped fuel the transformation of this quiet corner of the earth into one of the largest economies on the planet today. During and after this period the population continued to increase. The Gold Rush changed California demographics as indigenous people were displaced and mining towns appeared and disappeared across the Sierra Nevada Mountains. A less recognized consequence of the California Gold Rush was the massive environmental destruction that took place, which still plagues the Sierra today (Sierra Fund 2008, http://www.sierrafoothill.org/watershed/historic_conditions.htm).

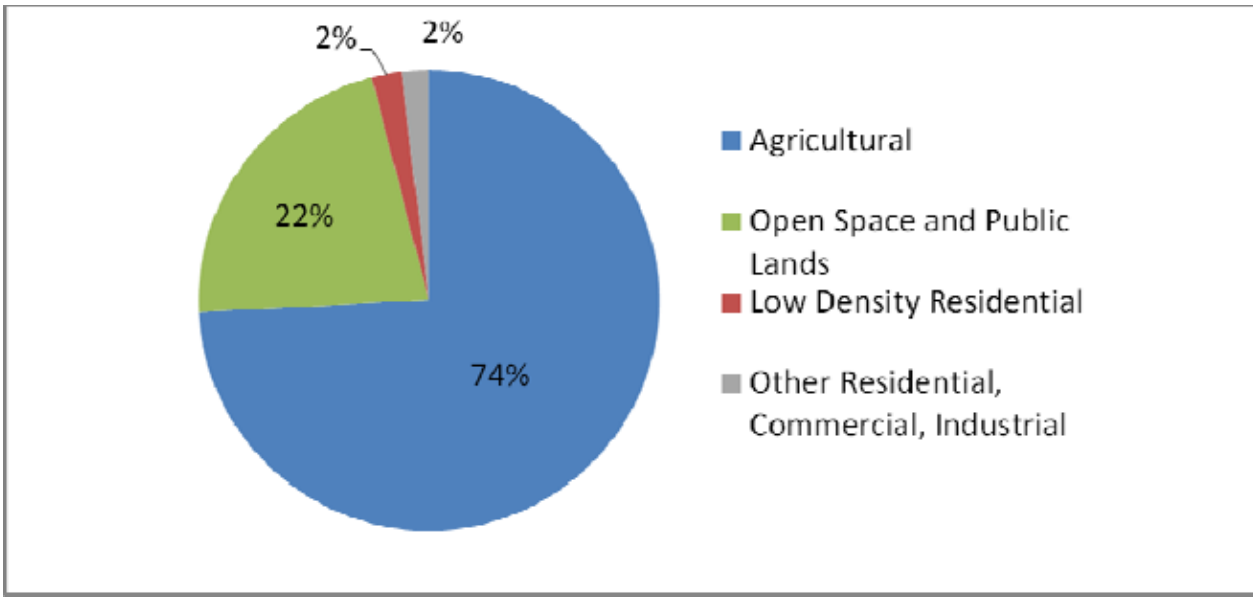

Figure 8. General plan landuse designations within the potential program areas.

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E.J. Remson/TNC

Grassland and oak woodland in the Tehachapi Mountains.

Chapter 4. Environmental Consequences

This chapter describes the foreseeable environmental effects (also impacts, results, or consequences) from implementing any of the three alternatives described in Chapter 2. For quick reference, we created a table (Table 4.4) at the end of the chapter to compare and summarize the effects we predict for each alternative.

A comparison of potential effects from each alternative provides the Service and the public with useful information about alternatives to protect valuable rangeland and wildlife resources, as well as their environmental impacts. Where appropriate, effects are considered in relation to the goals of the CFLA and the issues described in Chapter 1, "Purpose and Need for Action." Consistent with the affected environment, the effects analysis is organized within three basic themes: physical, biological, and socioeconomic, which is reflective of the categories in the **Affected Environment (Chapter 3).** However, some aspects of the physical, biological, and socioeconomic environment described in the Affected Environment section would not be meaningfully affected by the proposed action and its alternatives. Consequently, effects on the following resources are not discussed further:

? Geology & Topography
? Minerals and Energy Resources
? Soils
? Present Climate & Climate Change
? Visual Quality
? Air Quality

- Contaminants & Hazardous Materials
- Population
- Prosperity, Education, Race, and Ethnicity
- Regional Employment
- Cultural and Historic Resources

This determination of which resources may be affected by the proposed action and alternatives was based on the following assumptions and rational:

- Rangelands with relatively high wildlife values would be prioritized for protection;
- Rangelands protected by CFLA easements would be permanently protected from conversion to other land uses;
- Since the demand to develop rangelands is expected to continue, unprotected rangelands would be converted to other land uses under the no-action (Alternative A) and action alternatives (Alternatives B and C). Overall, the acreage of rangelands converted to other land uses in the future within each program area is not expected to change substantially if Alternative B or C is implemented (relative to Alternative A);
- The net effect of the proposed program would be to shift development away from some rangelands with relatively high wildlife value (those under easements) to rangelands with relatively less wildlife value;
- However, since the resources listed above would not be used to prioritize rangelands for easement acquisition, the impacts resulting from continuing conversion are expected to be virtually the same under each alternative.
- Neither of the action alternatives would involve any construction or other physical alteration of the landscape.

Conclusions and discussions regarding effects are determined from published literature or other available information. In the absence of published and available information, we base our comparisons on our professional judgment and experience, and the professional judgment and experience of recognized experts.

When discussing effects we express them as "positive," "negative," or "no effect." A positive effect would benefit or enhance the fish and wildlife resources or physical or socioeconomic environment under consideration. A negative effect would be detrimental to the natural resources, physical resources, or socioeconomic environment of the study area. No effect means there is no recognized or discernible effect, either positive or negative.

The effects of the Proposed Action (Alternative B) and Alternative C are expressed relative to the No Action Alternative (Alternative A). Most of our analyses conclude that effects (whether direct, indirect, or cumulative) would be relatively minor but difficult to quantify. However, we do qualitatively analyze and discuss the most probable effects based on available information, and where possible discuss whether they are direct, indirect, or cumulative, and whether they are short-term or long-term. Additionally, we discuss cumulative effects of implementing the alternatives in a separate section.

As required by the Council on Environmental Quality (CEQ) (40 CFR Part 1508.27), we assessed the importance of the effects of our alternatives based on their *context* and *intensity*. Their context ranges from site-specific to broad regional effects (Table 4.1). Although any potential CFLA program would comprise a small percentage of the large Rangeland Ring, we developed the alternatives in relation to how they may contribute to achieving our wildlife conservation mission. Context means that the action must be analyzed in several contexts such as the affected region, the affected interests,

Table 4.1 - Area of proposed CFLA easements expressed in geographic context.

Region or Locale	*Acres*
Rangeland Ring	14,000,000
Alternative B Program Area Total Rangelands	1,700,000
Alternative C Program Area Total Rangelands	2,370,000
Stanislaus County Rangelands	430,000
Merced County Rangelands	570,000
Mariposa County Rangelands	340,000
Kern County Rangelands	1,830,000
Tulare County Rangelands	440,000
San Benito County Rangelands	600,000
Alternative B Potential Rangeland Easements (four counties)	200,000
Alternative C Potential Rangeland Easements (six counties)	325,000

and the locality. We evaluated the intensity of effects based on the expected degree or percentage of natural resource, physical, or socioeconomic changes from current conditions, and whether they are positive or negative, or neutral.

4.1 Effects on the Physical Environment

4.1.1 Hydrology & Water Quality

Alternative A (No CFLA)

Under Alternative A, ranches within the Rangeland Ring would continue to be converted to other land uses. Expanding development in the foothills area represents a continuing threat to water resources. Development brings with it continued and chronic pollution due to long-term increases in traffic, industrial discharge, and construction-related emissions that eventually enter the aquatic environment. Sewage-derived nutrient additions to rivers and streams could have detrimental effects on the aquatic ecology; ammonia and organic nitrogen can enter water through sewage effluent and runoff from land. Housing and commercial developments can result in wetland destruction, water diversion, and introduction of invasive species on disturbed and exposed land. Development increases impervious surface, retards groundwater recharge, changes drainage patterns and heightens the rate of surface runoff, and increases soil erosion and nonpoint source pollution. As demand for potable water increases for new subdivisions and commercial enterprises, water rights could be challenged to a greater extent in the future. Groundwater aquifers would receive more demand, resulting in potential reduced yield in rangeland wells and degradation to the hydrology of river, riparian and related wetland areas (DWR 2003).

Some rangeland management activities have the potential to adversely affect water quality. This includes practices that involve potential pollutants such as oil, gas, and diesel spills, spills of paints, solvents, and the like, and runoff of herbicides or other pesticides. Water quality may be temporarily degraded locally due to soil erosion from bare fields and roads, construction of ranch buildings, as well as constructing and maintaining stock ponds. In addition, overgrazing and livestock trampling riparian areas can cause increased erosion of sediment and direct deposits of fecal matter into

streams. These are manageable activities whereby measures can be taken to eliminate or minimize any local effects.

Alternative B (Four County CFLA) and Alternative C (Six County CFLA)
Alternatives B and C are expected to have a beneficial but unquantifiable effect on water quality in the potential program areas and the watersheds that drain these areas because important aquatic and wetland habitat within rangelands would be permanently protected. As a result, some of the impacts of rangeland conversion described above would be avoided. Due to the larger amount of rangelands that would be protected in the long term under Alternative C, it would have a greater beneficial effect on water quality then Alternative B.

Benefits of preserving targeted areas of rangeland may include maintenance of the natural role performed by an intact vegetated environment. Because of the extensive root systems of grasses and forbs (some reaching over six feet below the soil surface) these plants can recover nutrients from the soil that would otherwise be lost or leached into groundwater in row crop ecosystems or other land uses (Atkin 2006). In some cases, livestock grazing has been found to enhance the ability of marshy spring-fed wetlands to retain nitrates and prevent them from entering streams, thereby improving downstream water quality (Allen-Diaz *et al* 2004). By focusing conservation easement acquisition on prime wildlife habitat we would be able to maintain watersheds which would have a beneficial effect on water quality and quantity.

4.2 Effects on the Biological Environment

4.2.1 Effects on Vegetation

Alternative A (No CFLA)
Under Alternative A, conversion of ranches to other uses would result in the continued loss, fragmentation, and degradation of vegetation resources within the Rangeland Ring. These potential impacts could result in the further decline of unique rangeland plant communities such as those found in vernal pool and on serpentine, gabbro, and Ione formations. Habitat loss and fragmentation may also act synergistically with climate change and other factors to magnify deleterious effects to species and ecosystems by limiting the ability of species to adapt or migrate (Hill *et al*. 2006; Ewers and Didham 2006). Habitat loss and fragmentation are considered the most significant threat to global biodiversity, with infrastructure development playing a key role (Wilcove *et al*. 1998).

As with most of California's native habitats, oak woodlands have not escaped impacts from intensive human settlement. Only two-thirds of California's original oak woodlands remain (~7 million acres) and only 4% have some form of permanent protection (Thomas 1997). In a study of oak woodlands in the rapidly growing areas of western El Dorado County, Wacker and Kelly (2004) observed numerous changes over a 50-year period as ranches were converted to rural residential development. They found that areas with working ranches tended to maintain open grassland and oak savanna habitats that stabilize vegetation changes over time. In contrast, woodlands converted to rural residential lost this stabilizing influence, resulting in complex vegetation changes and a general trend toward larger, denser, areas of mixed oaks, conifers, and shrubs. These areas at the wildland-urban interface are at increased risk of catastrophic wildfire and have reduced wildlife habitat quality.

Riparian habitat also would continue to be adversely affected under this alternative. Riparian vegetation in California makes up less than 0.5% of the total land area, an estimated 358,000 acres (CDF 2002). Yet, studies of riparian habitats indicate that they are important to ecosystem integrity and function across landscapes (Sands 1977; Johnson and McCormick 1979; Katibah 1984; Johnson *et al*. 1985; Faber 2003). Consequently, they also may be the most important habitat for landbird species in California (Manley and Davidson 1993). Despite its importance, riparian habitat has been

decimated over the past 150 years. Today, depending on bioregion, riparian habitat covers 2% -15% of its historic range in California (Katibah 1984; Dawdy 1989).

Under Alternative A, conversion of ranches to other uses would result in the continuing spread of invasive plants due to habitat destruction and soil disturbance. Soil disturbance generally encourages the establishment of invasive species in Californa (Bossard and Randall 2007). Non-native plants can alter ecosystem dynamics by disrupting ecological processes and degrading the quality of wildlife habitat (Trammell & Butler 1995; Mack and D'Antonio 1998; Masters and Sheley 2001).

Alternative B (Four County CFLA) and Alternative C (Six County CFLA).
Alternatives B and C are expected to have a beneficial effect on vegetation in the proposed program areas because important rangeland plant communities would be permanently protected. Although direct loss, fragmentation, and other development stressors on plant communities are likely to continue, with implementation of either Alternative B or C, some of these impacts are expected to shift away from biological diverse/unique plant communities. The CFLA may have positive cumulative impacts on native rangeland plants, and the overall biological diversity of the California foothills. The CFLA would provide protection and mitigate fragmentation of essential foothill habitats within the program area, thus maintaining key functional and structural habitat components that meet life cycle requirements of many rangeland species. Alternatives B and C are expected to have a beneficial effect on invasive species management in the potential program areas because important rangeland habitats would be permanently protected from conversion to other land uses which may increase vulnerability to invasion. In doing so, such lands would not be subject to development and its associated habitat destruction that exposes landscapes to invasive plant introductions and expansions. Due to the larger amount of rangelands that would be protected in the long term under Alternative C, it would have a greater beneficial effect on vegetation than Alternative B.

Results of scientific studies on the effects of grazing in California's Mediterranean climate have shown that grazing effects are very site-specific and can depend on the interaction between site conditions (e.g., soil type), weather, and grazing practices (Briske *et al.* 2011, Kimball and Schiffman 2003, Stahlheber and D'Antonio In Press, Huntsinger *et al.* 2007, Bartolome *et al.* 2009).

In California's Central Valley, grazing was found to maintain native plant and invertebrate diversity in ephemeral wetlands or vernal pools; whereas, at ungrazed sites invasion by non-native annual species reduced native plant cover and wetland inundation periods. An investigation of 72 vernal pools found that ungrazed pools had 47% lower relative cover of native species and 88% higher cover of non-native annual grasses than pools at continuously grazed sites. Species richness of native plants also declined by 25% and aquatic invertebrate diversity was 28% lower in the ungrazed compared with the continuously grazed pools. The inundation period of the pools was reduced by 50-80% in ungrazed pools, making it difficult for some vernal pool endemic species to complete their life cycles (Marty 2005).

Other research indicates that native annual forb species richness and cover are higher in grazed sites, coinciding with decreased vegetation height and litter depth. However, exotic annual grass and forb cover were also higher in grazed sites, and native grass cover and species richness did not differ in grazed and ungrazed sites. Consequently, it is recognized that cattle grazing might be a valuable management tool to conserve native annual forbs, many of which are species of concern (Hayes and Holl 2003).

Some rangeland management practices can have negative effects on vegetation, including inappropriate fire suppression (Biswell 1989; Stephens 1997) and overgrazing (Fleischner 1994; Belsky *et al.* 1999). Both practices can contribute to invasion of non-native annual grasses and cause long-term changes in habitat structure (Barnhart *et al.*1996). Annual grasses tend to out-compete

native perennials and young oak seedlings for soil moisture, while herbivory by cattle also can stymie oak sapling development (Hamilton 1997). These effects are minor compared to the complete loss of rangeland plant communities resulting from the conversion of the land to other uses and can be minimized by certain rangeland management practices.

4.2.2 Effects on Fish and Wildlife

Alternative A (No CFLA)

Under Alternative A, conversion of ranches to other uses would pose a continuing threat to fish and wildlife within the Rangeland Ring. Although difficult to quantify, there would likely be short- and long-term negative effects on migratory birds in the study area principally due to the loss of important foothill rangeland habitat relied upon by these species. Rangeland habitats play an essential role in their ability to carry out their life cycle of breeding, migrating, and wintering, which often is performed on local, regional, or continental scales. California's Rangeland Ring provides habitat to nearly every group of birds that inhabit the Pacific west – grassland birds, raptors, waterfowl, colonial nesting birds, shorebirds, secretive marsh birds, and a diverse array of neotropical migratory birds. These rangeland habitats, as described in "Affected Environment", would continue to be threatened by encroaching development and other disturbances associated with an expanding human population competing for land and water. Species in decline, or that are otherwise of conservation concern, would be directly affected by predictable losses of their habitat. The negative effects would be cumulative over time, and in a broader context may contribute to a diminished regional habitat complex for these important denizens of California's rangelands.

With continued loss of habitat, the patch sizes of remaining grasslands, which already have decreased, may continue to do so. Grasslands around the Central Valley are becoming increasingly fragmented by urbanization and, in some areas, encroaching woody vegetation (Fredrickson and Laubhan 1995). This fragmentation can have dramatic effects on wildlife. For example, grasshopper sparrows declined abruptly at approximately 10% urbanization (Bock *et al.* 1999). Recent research in California grasslands shows that grassland birds such as Savannah sparrow, horned lark, and western meadowlark are negatively affected by habitat tracts that are small and non-uniform in structure (Rao *et al.* 2008). Research from other North American grassland regions has demonstrated that grassland bird species (including species that breed in California) can be sensitive to patch size, with some species only found in grassland patches that are 100 times the size of an average territory of a given species (Herkert 1994; Vickery *et al.* 1994; Bock *et al.* 1999). With over 86% of grasslands being held in private ownership, these habitats continue to persist, but this is largely dependent on the economic viability of grazing (Davis *et al.* 1998). The drawback is that very little permanent protection exists and economic changes can cause loss of habitat (CPIF 2000).

Maestas *et al.* (2003) concluded that exurban (rural-residential) developments supported greater densities of tree-nesting and human-disturbance adapted bird species, as well as elevated numbers of domestic mammalian predators. Reserves and ranches, however, had increased densities of ground and shrub-nesting bird species and fewer predators. Bird species with elevated densities on exurban developments have likely responded to human-provisioned resources on those landscapes that were mostly absent from reserves and ranches. Such human-commensal species (blackbilled magpie and blue jay) on residential developments can be detrimental to other species via nest predation (Marzluff *et al.* 1998).

House cats and domestic dogs are predators that can extend the realm of human influence and have negative impacts on wildlife populations (Churcher and Lawton 1987; Miller *et al.* 2001). Loss *et al.* (2013) estimated that free-ranging domesticated cats kill 1.4–3.7 billion birds and 6.9–20.7 billion mammals annually. Feral cats, as opposed to owned pets, cause the majority of this mortality and are likely the single greatest source of anthropogenic mortality for birds and mammals in the U.S.
In the Greater Yellowstone Ecosystem, Hansen and Rotella (2002) showed that low-elevation lands serve as population sources for native bird species if they are not subdivided, but function as

population sinks when they are developed for rural residences. Exurban developments may have degraded habitat quality due to human disturbance and invasive animal species, and likely operate as ecological traps (which are locations where wildlife find elements of suitable habitat, but as a result of increased predation, competition, and parasitism, suffer reduced fitness when they attempt to reside there.

Alternative B (Four County CFLA) and Alternative C (Six County CFLA)
Alternatives B and C are expected to have a beneficial effect on fish and wildlife in the proposed program areas because important rangeland habitats would be permanently protected. Due to the larger amount of rangelands that would be protected in the long term under Alternative C, it would have a greater beneficial effect on fish and wildlife than Alternative B. Protection of rangeland habitat for migratory birds is a driving factor in proposing the CFLA, and may have direct, immediate and cumulative positive effects on resident, breeding, migratory, and wintering bird species. Narrative background on the status of migratory birds in the foothills, as presented in the Affected Environment (Chapter 3), provides a clear indication of the species that are imperiled or in some stage of decline, and the habitats they rely upon. Additionally, these Alternatives would contribute directly to the regional and continental goals of California's Riparian Bird Conservation Plan (2004), Oak Woodland Bird Conservation Plan (2002), and Draft Grassland Bird Conservation Plan (2000), as well as associated plans developed by California Partners in Flight and the Point Reyes Bird Observatory (Chapter 1).

Table 4.2 - Predicted relative benefit[1] of CFLA Alternatives to bird conservation targets

Conservation Target	*Alternative B*	*Alternative C*
Nuttall's woodpecker	Moderate	Moderate
oak titmouse	High	High
loggerhead shrike	Moderate	High
northern harrier	High	High
prairie falcon (breeding/wintering)	Moderate/high	High/high
burrowing owl	Moderate	Moderate
golden eagle	Moderate	Very high
yellow-breasted chat	Low	Low
yellow warbler	Low	Low
California thrasher	Moderate	High
Lawrence's goldfinch	Moderate	High
tricolored blackbird	Moderate	Moderate

[1]Relative benefit based on subjective analysis of modeled probability of occurrence within different program areas.

Rangeland areas with conservation easements would not be subject to fragmentation or degradation due to activities such as agricultural intensification, commercial and industrial development, energy development, or new residential developments. In addition, rangeland areas adjacent to existing protected lands would be prioritized for easement acquisition (see Appendix A, Chapter 3). Consequently, easement protection would protect key biological linkages, facilitate wildlife movement, and provide for wildlife habitat requirements. Additionally, the use of conservation easements would enable and support management activities (e.g., prescribed fire and grazing) that improve wildlife habitat. Retaining large and intact areas of habitat would also greatly reduce potential for human–wildlife conflicts at the "urban-wildland interface."

Large blocks of unfragmented foothill habitat throughout the proposed program area (Figure 4) serve as key breeding sites for many species. Oak woodlands have the richest wildlife species abundance of any habitat in California, with over 330 species of birds, mammals, reptiles, and amphibians depending on them at some stage in their life cycle (Verner 1980; Barrett 1980; Block and Morrison 1990). A number of the avian species are conservation priorities (Appendix C) and would directly benefit from habitat protection afforded by conservation easements. Table 4-2 identifies the predicted relative benefit to CFLA priority bird species under Alternatives B and C.

4.2.3 Effects on Special Status Species

Alternative A (No CFLA)

Under Alternative A, conversion of ranches to other uses would pose a continuing threat to special status species within the Rangeland Ring. Negative impacts on special status species within the proposed program area and throughout the Rangeland Ring are expected to continue. Habitat loss and fragmentation is probably the single largest threat to the survival and recovery of the listed species and species of concern that occur on rangelands. In addition, some species that may be considered common today and additional species that have not yet even been identified or described, will not be adequately conserved or may be lost altogether.

Alternative B (Four-County CFLA) and Alternative C (Six County CFLA)

Alternatives B and C are expected to have a net beneficial effect on special status species in the potential program areas because important rangeland habitats for these species would be permanently protected. Presence of priority species and/or habitats is a key factor in prioritizing lands for potential easement acquisition. Under the CFLA proposed action, habitat areas with conservation easements would not be subject to fragmentation or degradation due to activities such as residential, commercial, industrial, or agricultural development. Consequently, the CFLA would have long-term positive impacts on special status species discussed above and positive cumulative effects when combined with existing rangeland protection efforts described in Chapter 1. The CFLA would provide protection and mitigate fragmentation of essential foothill upland and aquatic habitats within the program area, thus maintaining key functional and structural habitat components, including corridor linkages that meet life cycle requirements of special status species and objectives outlined in their respective recovery plans. Table 4.3 shows the potential relative benefit of CFLA Alternatives B and C to special status species.

Some ranchland management activities that involve grazing, vehicular operations, building construction, and other disturbances necessary to maintain ranch viability have the potential to negatively affect some special status species. Overall, however, we expect these potential negative effects on special status species to be more than offset by the positive effects of permanent rangeland protection.

4.3 Effects on the Socioeconomic Environment

There are many dynamic variables at play when considering the social and economic effects of conservation easement acquisitions, especially given that potential purchases may span decades. Due to future uncertainty surrounding such factors as the likelihood and timing of easement acquisitions, the availability of Service funds to purchase easements, population growth, land values, and agricultural commodity markets, the economic effects of easement acquisitions cannot be quantified. However, these effects can be described qualitatively.

Alternative A (No CFLA)

Under the No Action alternative, current trends in land use described in Chapter 3: Affected Environment are expected to continue. According to American Farmland Trust, California's Central

Table 4.3 - Potential relative benefit[1] of CFLA Alternatives to special status species

Species	*Alternative B*	*Alternative C*
Bakersfield cactus	none	low
blunt-nosed leopard lizard	moderate	high
California condor	moderate	high
California red-legged frog	moderate	moderate
California tiger salamander	moderate	moderate
Central Valley steelhead trout	low	low
South Central California Coast steelhead	none	low
Colusa grass	low	low
Conservancy fairy shrimp	low	low
giant kangaroo rat	none	moderate
Greene's tuctoria	moderate	moderate
hairy Orcutt grass	moderate	moderate
Hartweg's golden sunburst	moderate	moderate
Hoover's spurge	low	low
Keck's checkerbloom	low	low
Kern primrose sphinx moth	none	moderate
Mariposa pussypaws	low	low
San Benito evening-primrose	none	low
San Joaquin adobe sunburst	low	low
San Joaquin kit fox	low	moderate
San Joaquin Valley Orcutt grass	moderate	moderate
San Joaquin woollythreads	none	low
Sierra Madre yellow-legged frog	low	low
southwestern willow flycatcher	none	low
Springville clarkia	moderate	moderate
succulent owl's-clover	moderate	moderate
Tipton kangaroo rat	low	low
valley elderberry longhorn beetle	low	low
vernal pool fairy shrimp	high	high
vernal pool tadpole shrimp	high	high

[1]Relative benefit based on subjective analysis of predicted distribution within different program areas.

Valley -- and specifically the San Joaquin Valley -- is facing development pressure, while still trying to maintain a high-quality, productive land base for agricultural production (Thompson 2006; Unger and Thompson 2013). Land under agricultural production is consistently being shifted into more urban uses. From 2006 to 2008, nearly 20,000 acres within the six-county study area were taken out of agricultural production. In many instances, this land was converted to urban or built up land or was classified as "other land", meaning it was taken out of production in anticipation of development or for environmental purposes (California Department of Conservation 2011). Within the Central Valley, many of the more urban areas are located within close proximity to highly productive agricultural lands. As a result, these lands are some of the first to be developed, as opposed to the development of less productive lands (Thompson 2006).

If current development patterns continue, it is projected that the San Joaquin Valley will lose 500,000 acres of agricultural land to development by the year 2050 (Unger and Thompson 2013). Within the entire Central Valley, developed land is expected to increase by 111%, with 882,000 acres of agricultural lands lost to urbanization (Thompson 2006). Additionally, it is projected that this decrease in agricultural lands will result in the cumulative loss of over $17 billion (in 2000 $) in agricultural sales from 2000-2040. It should be noted that this estimate does not take into account increases in efficiency that will increase output on fewer acres of land (Thompson 2006).

Rangelands face a variety of threats, including: conversion to more intensive land uses such as urban and rural residential development, orchards, and vineyards. Between 1984 and 2008, over 380,000 acres of California rangeland were converted to other uses (Marty *et al.* 2012). By 2048, the state's population is estimated to swell to more than 50 million people (California Department of Finance 2012). Seven of the top 10 fastest growing counties in California are Rangeland Ring counties. In total, the population of Rangeland Ring counties is projected to grow by 48% by 2050. Over the next decade, between 200,000 and 550,000 acres of land will be required to accommodate the needs of new urban residents and over half of this land is expected to be converted from rangeland.

Currently, three of the six counties in the study area have experienced an increase in property tax revenue. Revenue has increased by 7.25% in Kern County, 0.1% in Mariposa County, and 2.53% in Tulare County, though in Tulare County revenue from land property taxes has decreased. San Benito, Merced, and Stanislaus counties have all been experiencing a decline in revenue for several years, since 2009, 2008, and 2007, respectively. Under the No Action alternative, local government revenue within the proposed expansion area is expected to remain relatively stable, but is highly dependent on the volatility of the housing market as property taxes constitute the largest source of local governments' own revenue (Urban Institute and Brookings Institution 2008).

Alternative B (Four County CFLA) and Alternative C (Six County CFLA)

Land Use

Implementation of the proposed easement program would support continuation of current rangeland land use within the program areas, consistent with county general plans. Some of the benefits of conserving open landscapes are that they provide an array of goods and services that generate benefits for local residents, communities, and governments. Although local residents may not be able to explicitly use or access the private lands protected by Service conservation easements, these acres often create positive ancillary effects to surrounding areas. For instance, conserved rangelands would continue to provide valuable habitat for migrating wildlife species, and in turn, preserve recreation opportunities on neighboring lands (Rissman *et al.* 2007). It is well documented that open space carries positive values to local residents and communities, as well as to passers-by (McConnell and Walls 2005). This is evidenced by the success of open space preservation ballot initiatives at the local, county, and state levels. Banzhaf *et al.* (2006) found that between 1997 and 2004, over 75% of the more than 1,100 referenda on open space conservation that appeared on ballots across the U.S. passed, most by a wide margin.

It is also well documented that open space and protected natural areas can increase surrounding property values (McConnell and Walls 2005). The reciprocating value of open space on property values will vary depending on landscape characteristics and location attributes (for example, distance to the conserved area) (Kroger 2008). The permanence of the open space also is an influencing factor. Typically, open space that is permanently protected will generate a higher enhancement value of local properties than land that has the potential for future development (Geoghegan *et al.* 2003). Location and demographic factors in the region also can also influence the relative level of property enhancement value. For instance, open space may generate larger amenity premiums for property in more urbanized areas and where median incomes are higher (Netusil *et al.* 2000); this is not to say

there is not the chance for property values to increase substantially in rural areas as well (Phillips 2000; Crompton 2001; Thorsnes 2002).

Local Government Revenues
Service conservation easement acquisitions would inject new money into the local economy. Rangeland production activities are expected to remain the same and the sale of conservation easements provides landowners with additional revenue. Some percentage of these funds may be spent in the local economy, including purchasing new real estate, consumer goods, or services in the local area. Conservation easements also will help maintain the character of a region by protecting a traditional and historic way of life associated with working rangelands. Conservation easements provide financial incentives for landowners that may enable them to preserve the natural and historic value of their ranch lands and to pass this legacy on to their children and grandchildren. In addition to maintaining cultural heritages, the preservation of ranching operations can result in maintained economic benefits to the local economy. Ranchers' costs for equipment, supplies, and materials will be spent in the local economy, thus stimulating local businesses and supporting local employment. Ranch workers also will spend their salaries in the local economy, thus supporting further local employment.

While conservation easements are expected to have positive economic impacts, especially in the short term, there could be a relatively small amount of foregone development potential in the future. The degree of this forfeiture is unknown. However, given that the proposed easement acquisitions would total just 12-14% of the rangeland in the potential program areas and would likely occur over several decades, the impacts on development potential are expected to be marginal.

For lands under conservation easements, landowners would remain responsible for all property taxes. Conservation easements may reduce the fair market value of these properties by removing the speculative value associated with possible development; however, the conservation easement is not likely to greatly reduce the productive value of agricultural land. A conservation easement does limit the potential for agricultural conversion, and may therefore decrease the value of highly productive lands where intensification is possible. This would likely only impact a small amount of land, as most grazing lands within the area have poor soils that prevent any type of agricultural intensification. Therefore, properties under easements that are governed by Williamson Act contracts would likely have little impact on current property taxes because the easement would not greatly affect the agricultural use of the land. According to California Department of Conservation data, approximately 66% of the land within the boundary for Alternative B is currently under Williamson Act contracts (32% in Merced County, 66% in Mariposa County, 83% in Stanislaus County, and 79% in Tulare County). Approximately 69% of the land within the boundary for Alternative C is currently under Williamson Act contracts (same as Alterative B plus 75% in Kern County and 73% in San Benito County). Lands not enrolled in the Williamson Act are assessed annually from their established base-share value at the time of sale, and may increase by 2 percent to account for inflation (under Proposition 13). As described, the overall direction and magnitude of potential effects on valuation of properties under Williamson Act contracts and for those not under contracts, is based on a variety of elements, and cannot be precisely estimated. Overall, the effects of the CFLA conservation easement program on net revenues (revenues minus costs) to local governments are expected to be marginal given that current land use would be maintained in rangelands under CFLA conservation easements.

4.4 Cumulative Effects

Cumulative effects are defined by NEPA policy as the effects on the environment that result from the incremental effects of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7) .Because the proposed action is predicated on obtaining voluntary conservation easements we cannot identify at this time where those conservation easements in the Program Area will be obtained. Based on the modeling done to develop the action

alternatives we do know that there are well more than 325,000 acres within the Rangeland Ring that would be important for conservation. Therefore, the cumulative effects analysis focuses on the contribution of the proposed action to past conservation efforts as well as future conservation efforts.

Past Actions
The Land Protection Plan (Appendix A) provides a detailed summary of existing rangeland conservation efforts. A total of approximately 540,000 acres is currently protected with easements within the California Rangeland Ring through land trusts and public agencies. This represents 3.9 percent of the total 14-million acre Rangeland Ring. Within the Alternative B potential program areas approximately 4 percent of rangelands are protected with conservation easements. Within the Alternative C potential program areas, about 5 percent of rangelands are protected with conservation easements.

Present Actions
The Service's proposed action to launch the CFLA and protect up to 200,000 acres (Alt. B) or 325,000 acres (Alt. C) through the acquisition of conservation easements would complement existing and future rangeland conservation efforts (see Chapter 2 of Appendix A:Land Protection Plan). By its nature, the CFLA proposal, if implemented, would have positive cumulative effects for native fish, vegetation, and wildlife. Conservation easements would be established incrementally over the foreseeable future. If approved, it may take a number of years for the program to begin to have a noticeable effect. Securing initial funding and completing real estate transactions would take time. Acquisition of the proposed easement acreage under Alternative B could eventually increase the conserved rangelands in the potential program areas from 4 percent to 16 percent of the total area. Acquisition of the proposed easement acreage under Alternative C could eventually increase the conserved rangelands in the potential program areas from 5 percent to 19 percent of the total area.

Reasonably Foreseeable Future Actions
Reasonably foreseeable actions are actions and activities that are independent of the CFLA proposed action but could result in cumulative or additive effects when combined with the proposed alternatives. They are anticipated to occur regardless of which alternative is selected. Residential development, energy and transportation infrastructure development, and future foothills rangeland conservation efforts by a variety of organizations are the primary, reasonably foreseeable actions occurring in the potential CFLA program areas.

4.5 Environmental Justice

Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" (February 11, 1994), requires that federal agencies consider as part of their action, any disproportionately high and adverse human health or environmental effects to minority and low income populations. Agencies are required to ensure that these potential effects are identified and addressed. The EPA defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, and policies". In this connect, fair treatment means that no group of people should bear a disproportionate share of negative environmental consequences resulting from the action.

Demographic data exist for the counties within the proposed program area (Table 4.4). The population for each county varies with San Benito and Mariposa Counties having considerably fewer residents. Race and ethnicity varies modestly with the exception of Mariposa County which is predominantly white (>80%). Most county populations reflect a substantial percentage of white and Latino residents. Minority populations are generally well-integrated and dispersed geographically throughout the counties . There are, however, no areas with minority or low income populations that would be specifically affected by private ranches securing CFLA conservation easements.

Table 4.4 - Population by Race and Ethnicity Percentages in the Potential CFLA Program Area Counties

County	*Population*	*White*	*Latino Origin*	*Asian*	*Black*	*Native American*
California	37,692,000	39.7	38.1	13.6	6.6	1.7
Merced	260,000	31.3	55.7	7.9	4.3	2.4
Stanislaus	519,000	46.0	42.6	5.7	3.3	1.9
Mariposa	18,000	82.4	9.9	1.3	0.9	3.2
Tulare	449,000	32.0	61.3	3.9	2.2	2.8
Kern	852,000	37.9	50.0	4.7	6.3	2.7
San Benito	56,000	37.8	56.9	3.2	1.2	3.1

U.S Census Bureau - http://quickfacts.census.gov/

4.6 Summary of Effects

Table 4.5 - Comparison of environmental effects from potential Alternatives for the CFLA

Environment	*Alternative A: No Action*	*Alternative B: 4 County CFLA (200,000 acres)*	*Alternative C: 6 County CFLA (325,000 acres)*
		Physical Environment	
Hydrology & Water Quality	Continued adverse impacts on water quality due to conversion of rangeland to other uses.	Beneficial impact on water quality due to increased protection of functioning rangeland through CFLA easements.	Same as Alternative B, except somewhat greater beneficial impact on hydrology and water quality in the long term due to increased amount of rangeland protected.
		Biological Environment	
Vegetation	Continued adverse impacts on vegetation and unique plant communities due to conversion of rangeland to other uses. Expect negative impacts by invasive species.	Beneficial impact on vegetation due to increased protection of unique rangeland plant communities (vernal pools, and serpentine, gabbro, and Ione plant communities).	Same as Alternative B, except somewhat greater beneficial impact on vegetation in the long term due to increased amount of rangeland protected.
Fish and Wildlife	Continued adverse impacts on fish and wildlife due to conversion of rangeland to other uses and resulting loss, degradation, and fragmentation of habitat.	Beneficial impact on fish and wildlife noted in Affected Environment and especially priority species identified in Appendix C due to increased protection of functioning rangeland through CFLA easements.	Same as Alternative B, except somewhat greater beneficial impact on fish and wildlife in the long term due to increased amount of rangeland protected.

Environment	***Alternative A: No Action***	***Alternative B: 4 County CFLA (200,000 acres)***	***Alternative C: 6 County CFLA (325,000 acres)***
Special Status Species	Continued adverse impacts on Federal and State listed species such as California condor, California red-legged frog, vernal pool species, and kit fox due to conversion of rangeland to other uses and resulting loss, degradation, and fragmentation of habitat.	Beneficial impact on special status species noted in Affected Environment, and especially priority species identified in Appendix C, due to increased protection of functioning rangeland through CFLA easements; increased potential for special status species recovery.	Same as Alternative B, except somewhat greater beneficial impact in the on special status species in the long term due to increased amount of rangeland protected.
Invasive Plants	Continued adverse impacts from establishment and spread of invasive plants due to rangeland conversion.	Reduced spread and establishment of invasive plants due to retention of intact rangeland habitats.	Same as Alternative B, except somewhat greater beneficial impact on invasive species in the long term due to increased amount of rangeland protected from conversion.
Socioeconomic Environment			
Socioeconomics	Continued conversion of rangeland to other land uses and loss of associated ecosystem services. Moderate fluctuations of local government revenues, depending mainly on volatility of housing market.	Support for continuation of current rangeland land use in programs areas and protection of ecosystem services they provide. Potential increase in property values surrounding rangelands with easements. Payments from easement acquisitions would also inject new money into local economies. Marginal changes in net revenues to local governments.	Same as Alternative B, except somewhat greater effects in the long term due to increased amount of easement acquisition.

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